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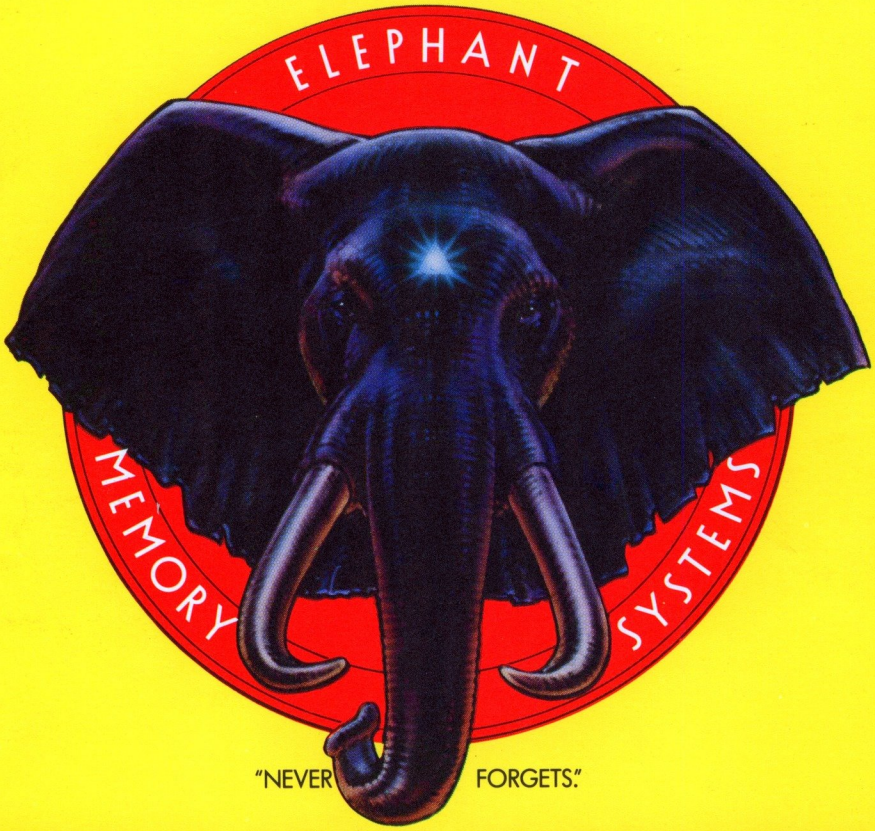

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7:30 PM, Tuesday, December 21, 1982

Swan Computers
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Guest Speaker
Jay Bakst/Alternative to Flow Charting

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7:30 PM, Tuesday, January 18, 1983

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Mike DeVille/Basis 108 Computer

7:30 PM, Tuesday, February 15, 1983

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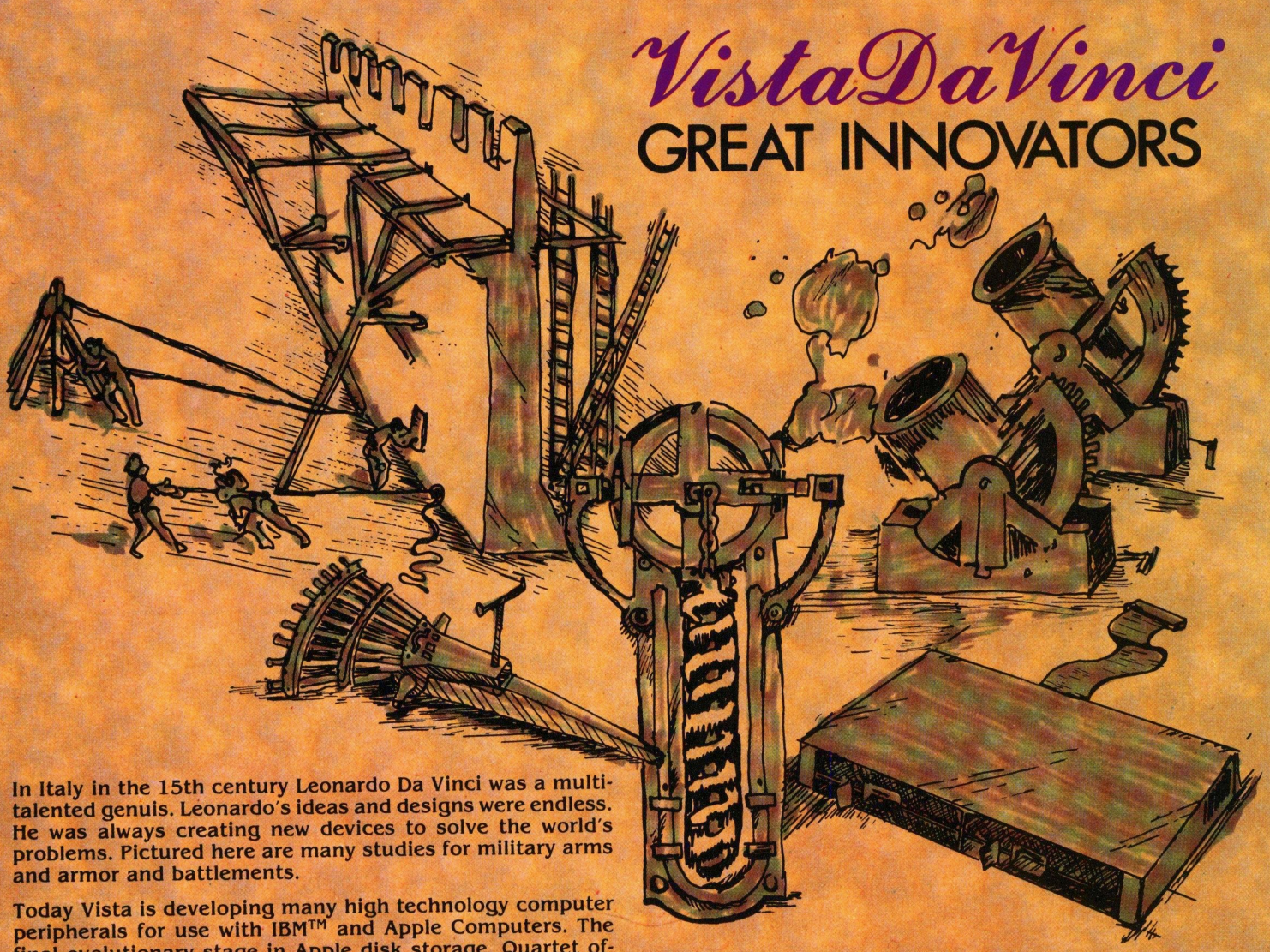

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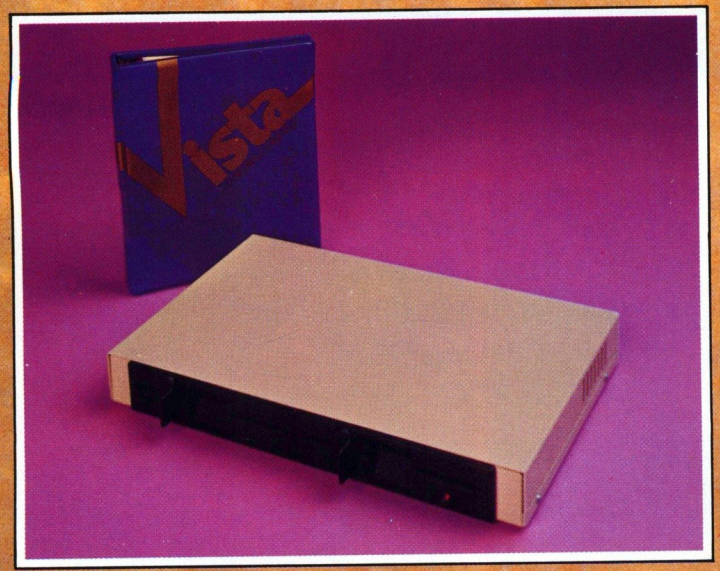

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THE EDITOR BYTES BACK

the editor

VIEW from 37,000 feet: enroute to Houston Applefest; nearly clear skies, only a hint of haze, scattered tan-tinged cloudlets from the corner of the eye. One of the fleeting moments of relaxation we get, an opportunity to think ahead to the new year, a glimpse into the **Call -A.P.P.L.E.** crystal ball.

What's in store for the year 1983? When rumors circulate so widely the furthest outreaches know of them, rumor becomes fact. In true **Call —A.P.P.L.E.** tradition, we plan in depth coverage of the newly redesigned Apple][motherboard as soon as it is announced along with appropriate tech notes when they become available. **Call —A.P.P.L.E.** will tell you first about other new Apple Computer, Inc., products as they are announced.

RAM card prices are dropping to record lows; our own **AP.RAM/16** is only one such example. Starting in this issue, we'll help you explore the untapped potential of a RAM card. **Bill Starbuck's Doing it With a Naked Apple** suggests some possibilities; others come to light in Part 1 of **New Uses for the RAM Card** which introduces **Mark Harris** to our pages, along with a new concept: a continued story, continued not from one issue to the next, but from one magazine to another! Part 2 which explains how to use the RAM card as a copy program buffer, appears in issue no.3 of our companion publication **Call -A.P.P.L.E. in Depth: All About DOS.** Sure, this is another of our "sneakys," but when you get it, you'll find that like its predecessors, it will rapidly become one of your most valued reference works.

In almost every issue of **Call -A.P.P.L.E.** we introduce authors who have sought us out with a new technique to reveal, or solid information to assist new Apple users. In this issue, all four cover stories fall into that category, thus it behooves us to remind our readers, members and non-members, that we are interested in what you have to offer. We are not hyper-critical on style; that is what editors are paid to do. If you have a technique or application you would like to share with your fellow members, send a 37 cent stamped, self-addressed envelope to the Editorial office as listed on Page 2, and ask for a copy of our authors' guidelines. We have a minimum rate of $50 per published page.

One of the things we pride ourselves on is the ability to drop in, virtually at press time, an entire new story. This is what happened at Houston Applefest when we met author **Kelly Puckett.** We talked for a spell then, while he was having a byte to eat back at the concession area, Kelly cranked out **The Unknown INTFLAG** in a matter of moments, along with a short demo program. If you've been looking for a way to distinguish variable types that you are passing to an assembly language program, then you'll want to read this note.

From the Phillipines comes our fourth feature story by first-timer **Luis Hernandez: Basic Suggestions for a Novice Programmer.** Here Luis puts in print some basic facts and techniques often overlooked by the beginner. We suggest you take a look.

Also of interest, **A.P.P.L.E.** secretary **Dave Lingwood** explores **Problem Solving in BASIC,** and offers some hints on avoiding the infamous Applesoft rounding error, as does staff writer **Cornelis Bongers** in this issue's **A.P.P.L.E. Doctor.**

Last month **Dave Sparks** presented persuasive evidence of how easy assembly language really is along with a convincing example of directly converting a BASIC program, line by line, to assembly. This time around, we have a short feature entitled **Apple Writer Converter** by **Thomas G. Williams** and ourselves which converts an Applewriter I binary file to a standard ASCII text or binary file. It is presented first as a pure BASIC program, then as a combination BASIC and assembly program. Try both versions yourself; you'll find the speed differences are **dramatic.** This is just one reason why we constantly preach and publish assembly language.

One utility worthy of special mention is **Ctrl-C Killer.** Author **S. Scott Zimmerman** has his own (explained) reason for having written it, but one important and unmentioned idea is its application in making a program "user proof". Take a glance; you'll see what we mean.

This is the final month for the publication of our **So What Did You Expect Dept.** contest entries; you'll find them scattered throughout this issue, along with details of the **So What** contest and **Michael Thyng's Eamon Adventures** contest.

We note with pride this is our biggest **Call -A.P.P.L.E.** to date. We think it's all exciting reading, and there's still a bunch more on the contents page.

See if you don't agree.

```
]LIST

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     55,251: PRINT
     : CALL 65171:
     POKE 56,88: POKE
     57,252: GET A$:
     CALL 65161: POKE
     37,11: CALL 64546:
     POKE 36,8
20 READ A: IF A > 0
     THEN  POKE  PEEK
     (40) +  PEEK (41)
     * 256 +  PEEK
     (36),A: CALL 64500:
     GOTO 20
30 CALL 976: DATA
     211,207,160,215,200,19
     3,212,160,196,201,196,
     160,217,207,213,160,19
     7,216,208,197,195,212,
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BYTES FROM A.P.P.L.E.

Val J. Golding

GOOD Morning. Welcome to the Christmas season and all that goes with it. By now we hope you have received our 1982 Christmas wish list. If not, don't call... we've either fallen behind schedule or Uncle Sam and the postal service have. Our catalog has gone to you via first class mail, never fear.

One of the interesting things about attending Applefest and computer shows is some of the "deals" we can make on the spot to save our members some cash on publications and hardware. F'rinstance: *Bill Sanders,* a contributor to *Call –A.P.P.L.E.* in the past, has written a book **The Elementary Apple.** We spent some time looking at it, found it a very instructive tutorial, and said "Let's do it!," so here it is at $11, a savings of over 25%.

F'rinstance number two is our new hobby/prototyping board, fully drilled and tinned, and with gold plated edge connectors, just waiting for your components at $15. Next comes our **Ap.RAM/16,** *modestly* priced at $50, ready for you to load Big Mac.LC, Integer Basic, DOS or your pleasure. This ties in neatly with a couple of articles in this and forthcoming issues that say: "now you've got it, here's what it can do".

Here's another one, fresh from the 'fest. We've been looking for some time now for a quality joystick that met our standards, and we think we've found it. Watch this space next month for details on this and a sensational low-priced copy holder.

One hardware product which took us almost completely off guard is an innovative item undescriptively called the **LCM100.** What LCM stands for is *Line Carrier Modem,* a modem that works not on telephone lines, but on household AC ciruits, at a rate of up to 9600 baud. With the LCM100 you can connect a printer or video terminal/keyboard combination up to 800 feet away from your Apple and control the Apple from the keyboard or output to the printer. The retail price on this is $365; members of A.P.P.L.E. can steal it for $225!

Publications, hardware, what else? Oh yes, software, can't forget that! **Ap. Graphics: the Filler** is the first in a series of programmers' graphics utilities. The Filler is a fast, fast, fast assembly program where you can draw an outline and almost instantaneously fill it with any one of 21 available colors. For less than 25 bucks you can't go wrong. Available early 1983.

Do we support the Apple *III* we're often asked. Yes, indeed we do! **Word Weaver***III* was among the first, and among the finest word processors for the Apple *III*; a special sale price of just $60 is one of our Christmas gifts for you. Between now and January 31st, you can save $15 by ordering it.

Diskettes with programs on them are called "software," but what do you call them if they are blank? Certainly not "hardware." Media perhaps? That does seem to fit the bill. In any case, pick up on our diskette special, good through January 31st, for ten CDC label diskettes in a reuseable fiberboard box for only $23. No limit.

We wish we could tell you more but you'll just have to wait another month. One thing you can be assured of: we'll almost certainly turn out a new quality product or three from the San Francisco Applefest.

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BASIC Suggestions

Luis M. Hernandez

OUT here in the Phillippines we do not grow apples, but do have Apple] ['s and we too are getting caught up with the *Apple-mania* which now plagues many nations. BASIC is one of the languages spoken by micro-computers and because of it, people like you and I who deal with these wonderful machines can speak in this universal language which is so precise that it transcends all races, nationalities and physical barriers.

Using BASIC, we are able to communicate ideas, procedures, systems or whatever, without going through the usual problems of semantics, context or "hidden" meanings behind words. We can write the language in a straight-forward manner and a "statement" made in BASIC can only take on a single meaning, whether it be a Filipino, an American or any other who may happen to read it.

Rosy as it may seem, there are still problems - not in the language itself, but in learning and becoming proficient in it. Therefore, I wish to pass on my experiences as a beginner who tumbled and fumbled through the basics of BASIC. I dedicate this article to those novices who have the willingness and determination to learn. I offer several suggestions which I have learned the hard way and hope that those who are just starting will avoid the long route and achieve proficiency in the quickest possible time.

I. Suggestions On Over-All Program Structure And/Or Techniques

1. Always begin your program with a TEXT and a HOME. The HOME offers a "clean slate" so to speak before any output is written on the video screen. The TEXT command insures that the screen is a full 24 x 40 characters. Without it, your program output may act funny since a previous program may have altered "window" margins on your screen.

2. If you wish to center a line on a screen, please do not count the letters and spaces like I did before (my wife actually thought I was going mad when she saw me talking to myself an counting with my fingers like a first grader). To center a printed message, simply use a string variable and let the computer do the rest like so:

```
100  A$ = "YOUR MESSAGE"
110  PRINT SPC((40-LEN(A$))/2);A$
```

Alternatively, you can use

```
120  PRINT TAB ((40-LEN(A$))/2)
     ;A$
```

or,

```
130  HTAB ((40-LEN(A$))/2):
     PRINT A$
```

If you happen to have an 80-column board, simply change 40 to 80. It also works with line printers although line 130 above won't. Stick to the other alternatives when centering print on a line printer. Okay? I hope from now on you stop counting letters when centering messages or titles on the screen

3. If you are developing a program with many variable inputs, you may find that somewhere about mid-program, you key in the wrong value and then pressed "RETURN". Having realized your mistake you now bang the table (not the Apple, I hope) and start wishing you could go back to the previous line and change the input value. You have two choices: a) re-run the program from the start, or b) continue and let the program take its natural course to the end, which undoubtedly will give the wrong results. Do not despair, for I too have experienced this. I devised a so-called "double-return" technique which gives me a chance to confirm an input variable by having to press "RETURN" twice before the program proceeds. Thus,

```
LIST

110   TEXT : HOME
120   VTAB 10: PRINT
       "ENTER VALUE OF
       X=";
130   HTAB 20: INPUT
       20: INPUT "";A$
140   IF A$ = "" AND
       FLAG = 0 THEN
       120
150   IF A$ = "" AND
       FLAG = 1 THEN
       170
160 X =  VAL (A$):FLAG
       = 1: VTAB 10:
       GOTO 130
170   VTAB 10: HTAB 20:
       PRINT X:FLAG =
       0
180   REM  REST OF YOUR
       PROGRAM
```

The above routine allows recovery from:

a. Pressing "RETURN" without keying in a value yet;
b. Keying in a wrong value and pressing "RETURN".

Of course, if you haven't pressed "RETURN" after keying in a value, you can always use the old "left-arrow" key to change the input value. This routine also helps those, like myself, with big fingers who always seem to hit keys other than those intended when typing.

You may also note that we used a "FLAG" variable, which brings us to the next topic. —◉→

4. Flags are very useful in programming because they, together with the IF...THEN statement, can control program flow quite effectively. Flags are very similar to "signals" which tell the computer which program branch to process next. For example, if you were driving your car towards an intersection, you will notice that the traffic light controls your movement as well as those of other cars. A red light tells you to stop, a green light tells you to go straight, a left-arrow to turn left, etc. Program flags work the same way. Look at line 140 above. This line tests if FLAG is 0 and if A$ is null. These conditions are true if no value was keyed in and a "RETURN" was pressed, thus creating an error condition. This line simply recovers from that error and you are again prompted for the value of X in line 130.

   If a value has been keyed in, then A$ is not equal to null. This brings us to line 150 which again tests A$. Since A$ is not null, then line 160 is processed. Here A$ is converted to its numeric value and stored in X. Note also that in the same line, the variable FLAG is set equal to 1 in preparation for the second pass (the input confirmation pass or your second "RETURN"). Since you are transferred back to line 130, you have the option of keying in a value or "confirming" the previous value. If you simply press "RETURN" at this point, A$ is set to null and line 140 is again processed. Since you have set FLAG equal to 1 in line 160, the test for FLAG in this line will yield a false and you end up in line 150. In this line you will note that both conditions are true during this second pass, and program execution is directed to line 170 which prints the value of X, resets FLAG to 0 and goes on with the rest of your program.

   There, that was simple wasn't it? So you see, the BASIC language is beautiful because in so very few words, much meaning is communicated.

5. Having discussed the use of flags, we now can discuss the use of GOSUB's as useful programming techniques. GOSUB's are unique in that they save memory space (you don't have to use those same lines over and over again throughout your program). GOSUB's can be used for common print routines, common input routines, common screen messages, etc. Try to study the short program below:

```
]LIST
10   TEXT
20   HOME
25 I = 1: VTAB 1
30 A$ = "ENTER FIRST
      NUMBER=": GOSUB
      1000
40 A$ = "ENTER SECOND
      NUMBER=": GOSUB
      1000
50   FOR I = 1 TO 2
60   VTAB I: HTAB 21
70   INPUT "";A$
80   IF A$ = "" THEN 100
90 A(I) =  VAL (A$)
100  VTAB I: HTAB 21
110  PRINT A(I)
120  NEXT
130 A(3) = A(1) + A(2)
140  PRINT :A$ = "SUM
      IS=";FLAG = 1:
      GOSUB 1000
145  VTAB 23: CALL - 868
150  VTAB 10
160  PRINT "SELECT NUMBER:
     ":PRINT
170  PRINT "1. EDIT
      INPUT DATA"
180  PRINT "2. EXIT"
190  GET X
200  IF X < 1 OR X >2
      THEN PRINT  CHR$
      (7): GOTO 190
210  ON X GOTO 220,240
220  HOME : VTAB 23:A$
      = "PRESS 'RETURN'
      TO ACCEPT DEFAULT":
      GOSUB 2000
230  GOTO 25
240  END
1000  PRINT  SPC( 20
      -  LEN (A$));A$;:
      IF FLAG = 1 THEN
       PRINT A(I);
1010  PRINT
1020 I = I + 1
1030  RETURN
2000  PRINT  SPC( (40
      -  LEN (A$)) /
      2);A$
2010  RETURN
```

   The above program uses several useful concepts in programming. The first is the use of the GOSUB. The GOSUB's were used in lines 30, 40 and 140. If the steps in lines 1000–1030 were not used as "GOSUB" routines, then you would have had to write lines 1000–1020 three times (i.e., one for each occurrence of the GOSUB in lines 30, 40 and 140). So the use of GOSUB's are indeed very useful in saving memory space, time and effort. There is, however, a trade-off, since GOSUB's require longer to execute than straight line code. GOSUB 1000 and GOSUB 2000 are what you may call "formatting" routines. These are simply routines to determine where your input messages and output will be placed on the screen. Can you guess what GOSUB 2000 does? (No, don't tell me you forgot!).

   Let's try and examine line 30 and 40 above. Instead of providing direct statements like:

```
30  INPUT "ENTER FIRST
    NUMBER = ";A(I)
```

   we decided to go via the "string" approach. Its advantage is that all input variables required for computation are immediately displayed and the user immediately knows what inputs are required of him.The "cursor" (you know, the blinking square on the screen) is positioned by, and serves as a prompt for the next variable to be entered. This is the second concept: the so-called "fill-in-the-blanks" input approach. Had we used the "INPUT" statement directly in lines 30 and 40, the input prompts would have appeared one at a time, namely, the prompt for the "second number" would appear only after the value for the first variable ("first number") had been entered. But then one may say at this point that it really is a matter of choice as to which method of input to use: direct input statements or "fill-in-the-blanks." Before you pronounce judgement, read on and think about the next related concept.

   The "fill-in-the-blanks" input method prepares you for the program's ability to accept changes in input without having to type "RUN" again after the computer completes processing. This approach will enable you to provide your program with "what if..." capability. But before going into this in detail, look at lines 150–200. These lines actually generate a "MENU" which is the third concept applied in the program above. Although it differs from the menu offered by McDonald's, it still offers "courses" which are really

courses of action or alternatives from which to choose. The use of a "menu" concept is helpful in that it simplifies your programming task. Programming is done a lot easier if you break up the whole task into simple, uncomplicated chunks. If you examine the large professional programs currently available on the market, they may look complex at first, but in actuality they are made up of smaller chunks which are simple as can be; in fact, more often than not, they are as simple as the programs you and I write. Yes, even professional programmers use menus. I think it would do you good to follow in their steps and think in terms of small chunks which you can later put together to form more complex structures.

The menu of the program above offers us two choices: to "Edit Input Data", or to "Exit." Let's examine the menu more closely. Lines 150–180 are simple enough. They simply print the courses of action available to you. Line 190 stops program execution and waits for your choice. After entering your choice, line 200 "validates" your input. This simply means it tests whether your entry is acceptable. If not, a bell (beep?) is sounded and program execution is again halted to await your entry in line 190. Once your entry is found acceptable, line 210 directs execution accordingly. If your choice was no.2, then the program terminates in line 240. If the choice was no.1, then the message "PRESS "RETURN" TO ACCEPT DEFAULT" is printed at the bottom of the screen. "DEFAULT"...Hmmmmmm... yes, we often see this word in computer manuals and other articles. Can this be a game where one team fails to show up and loses by "default"? True, losing by "default" means you lose for "failure to act" or "failure to appear" for the scheduled game. In our program, the "default" value of a variable is that value which is currently assigned to it. So if we simply press "RETURN", then the variable's value is unchanged because we "failed to act" or change the current value. "Failure to act" = "Default"="Unchanged"—see, very simple, isn't it?

Getting back to line 30's GOSUB 1000 statement, you will notice that because the variable FLAG has been set equal to 1 in line 140, the existing value of variable A(I) will be printed after its corresponding input prompt on the screen. These are the "default" values. When the program halts for input in line 70, the cursor will be blinking over the first digit of the "default" value. If you wish to change this value, key in a new number and press "RETURN"; otherwise, simply press "RETURN" with no value keyed in and you will see the "default" value remain unchanged as the cursor advances downward to prompt for the next variable input. This whole process occurs in lines 70-90 where A$ is tested for a null (a condition where a "RETURN" was pressed with no new value keyed in), in which case execution is directed to line 100 where the previous or existing value of A(I) is printed. If a new value had been keyed in, the test for A$ as null would be false and the new numeric value of A$ is assigned to A(I), thus eliminating the old value. "Default" is the fourth concept we have applied.

The combined use of the "fill-in-the-blanks," "menu" and "default" approach can make your programs quite flexible and easier to use because you are able to recover from input errors and change input values with fewer keystrokes and answer "what if..." questions without having to re-type "RUN" or input all variables again from the start. Its usefulness becomes greater as the number of your input variables increase; not to mention the "professional" impression your programs give. If you are a novice at programming, spend some time studying the program above. It's not too long but the knowledge gained will carry you far. Study its GOSUB's, FLAG's, screen format, "default" and "menu".

II. Suggestions On Print Routines

1. As novices, we have all gone through the discovery of how the Apple text screen works. We have learned the effects of commas, semi-colons and the "carriage return" in PRINT statements and how these affect screen format. You probably know that when printing at line 24 of the screen, the next carriage return encountered will scroll up to the contents of the screen thereby losing the printed message in line one (if any).

We have also labored to perfect our screen format only to find out that when we have more than 24 lines to display, the program continues to scroll output up until the last PRINT is executed; but, alas, we have lost the top portion of output at a speed too fast for our eyes to catch, much less for our brains to comprehend. Consider the program below:

```
]LIST

10  TEXT
20 A = 1:B = 0:C = 100
30  IF C - B <  = 23
      THEN B = C: GOTO 50
40 B = B + 23
50  HOME
55  FOR I = A TO B
60  PRINT I, INT (I
      ^ 2), INT (I ^
      3)
70  NEXT
80  PRINT "PRESS ANY
      KEY TO CONTINUE";:
      GET A$
90  IF B <  > C THEN
      A = I: GOTO 30
100  END
```

An alternate program would be:

```
]LIST

10  TEXT
20 C = 100
30  FOR I = 1 TO C STEP 23
40  HOME
50  FOR J = I TO I +
      22
60  IF J > C THEN 80
70  PRINT J, INT (J
      ^ 2), INT (J ^ 3)
80  NEXT
90  PRINT "PRESS ANY
      KEY TO CONTINUE";:
      GET A$
100  NEXT
```

The first program above is designed to print out a table of squares and cubes for numbers 1 to 100. Line 30 tests if the remaining number of lines to be displayed is greater than or equal to 23 (the number of lines allocated for screen print out). If so, the upper limit of the loop "B" is increased by 23. After 23 lines have been printed, it prompts with a message in line 80. Please note the very important application of the semi-colon (;) after the PRINT statement in this line. This prevents a carriage return from being sent to the screen and scrolling up the text. Line 90 tests if all of "C" lines have been displayed. If not, the lower limit "A" is likewise increased and execution proceeds in this manner until all "C" lines have been printed in batches of 23 lines per batch.

BASIC SUGGESTIONS

2. Like many novice BASIC programmers, after having perfected their video print routines, separate print routines are written to transfer the screen contents on to a line printer. Thanks to an article written by Bill Parker, "Examining the Video Text Buffer," *Call -A.P.P.L.E.*, February, 1982, a BASIC routine to dump the screen on to a line printer has been inspired in me. Much of the work has been done by Mr. Parker in mapping the Apple text screen. The same issue of *Call -A.P.P.L.E.* also contains an article on a "Text Screen Dump" by David W. Walker, but it is written in machine language. If one does not mind a slight delay (7 seconds) before the line printer starts to work, then the BASIC routine may be his logical choice to dump the screen contents on to a line printer. For the sophisticated, machine language lovers, you have Mr. Walker to thank for the excellent job he has done in providing us a text screen dump routine. (**Note:** *For the program below, please change line 90 accordingly to accommodate your printer slot number).*

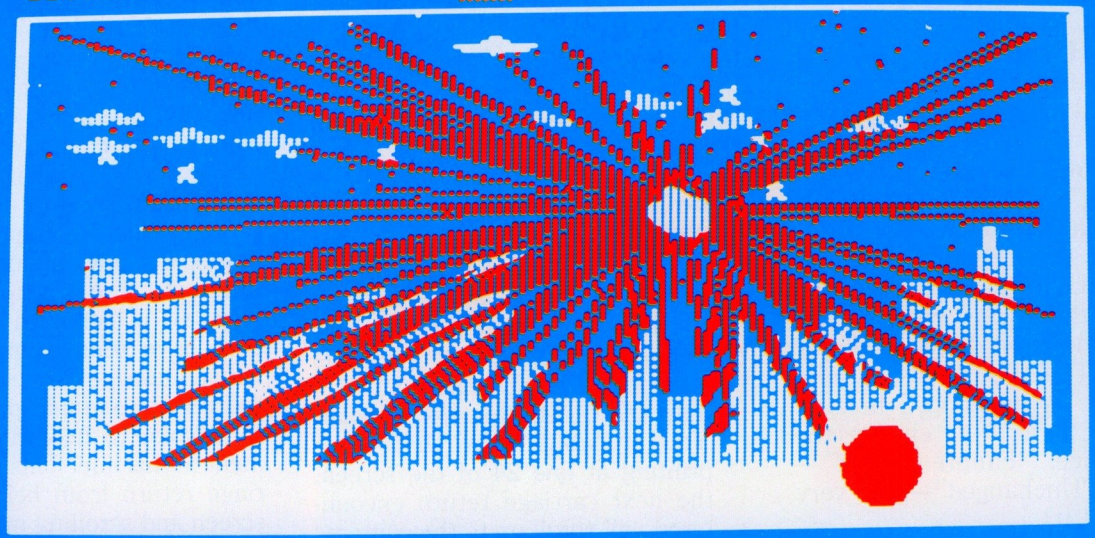
Novices, let's move ahead now and please, if you have your own techniques and suggestions, pass them on to even newer beginners (and to us, too, for we can also use them). It is the only way to go in this brotherhood of Apple lovers.

```
]LIST

10   DIM A(960):T = 1
20   FOR K = 1024 TO
       1104 STEP 40
30   FOR I = K TO K +
       896 STEP 128
40   FOR J = I TO I + 39
50 A(T) =  PEEK (J):T
       = T + 1
60   NEXT J
70   NEXT I
80   NEXT K
90   PRINT  CHR$ (13);
       CHR$ (4);"PR#1":
       PRINT  CHR$ (0);
100  FOR I = 1 TO 960
       STEP 40
110  FOR J = I TO I
       + 39
120  PRINT  CHR$ (A(J));
130  NEXT J
140  PRINT
150  NEXT I
160  PRINT  CHR$ (13);
       CHR$ (4);"PR#0"
```

3. A last note for novices: Take your precious disks out of the drive(s) and replace them with "scratch" disks or any disk you don't mind "wiping out" data from. *Then,* monkey around with the computer; experiment with your programs; don't be afraid to try anything. As many people have said, there is nothing you can do at the keyboard (short of using a sledge hammer on it) that will damage your precious Apple. Much of our knowledge today stems from accidental discoveries made by people who are moved by gut feelings to POKE (or PEEK?) into the unknown. If you run out of ideas, read books, articles or whatever you can lay your hands on. Better yet, join *Call -A.P.P.L.E.* It is made up of people who like to POKE and love to share their knowledge.

a city dies whenever nightfalls



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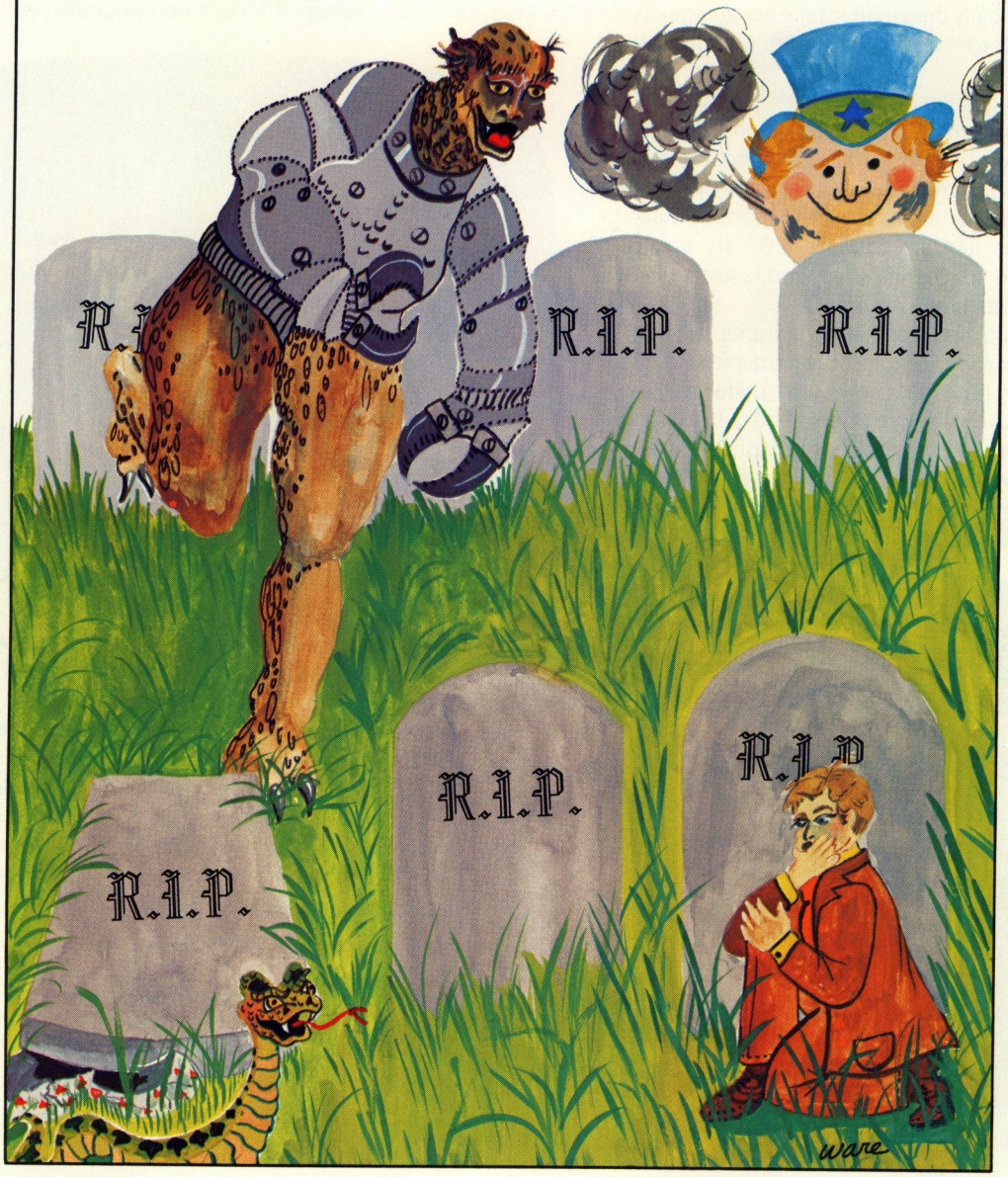

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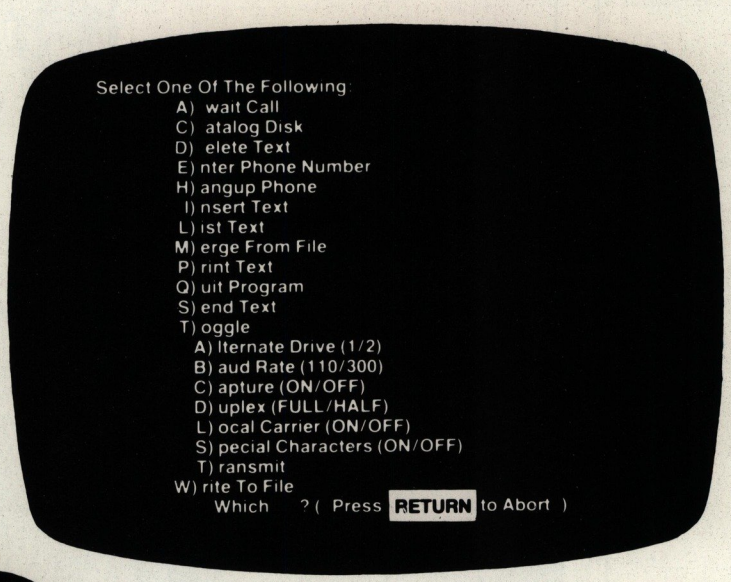

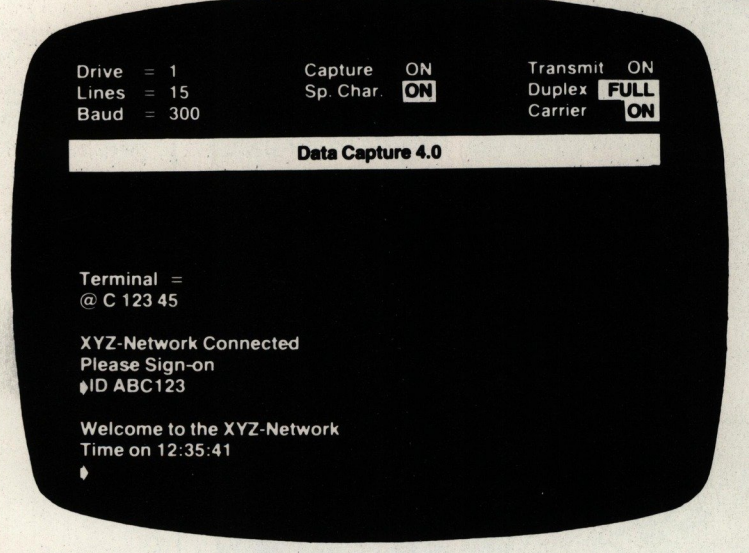

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Doing It With A Naked Apple

RELOCATING MACHINE LANGUAGE

Bill Starbuck

MY 16K card was doing me almost no good at all, so I was elated to see Cornelis Bongers' DOS MOVER in the August 1981 issue of *Call -A.P.P.L.E.* DOS MOVER transfers the DOS program into a 16K card or a language card, fills the remaining space on the 16K card with five input-output buffers, and places transfer instructions at the top of the main memory. Bongers also explained how to modify the Program Line Editor (PLE) so that it can be loaded into the space just below the DOS transfer instructions.

However, these changes left me no better off than before because I use the Program Global Editor (PGE) as well as PLE. Since PGE continued to load into the same locations as before, HIMEM remained the same, and 10.5K of space lay inaccessible between PGE and PLE. The center column in Figure 1 shows the problem.

To solve this problem, I relocated PGE so that it snuggles up against PLE. The experience presented enough challenges to keep me interested, it taught me a lot about machine language, and it gave my Apple 10K more space for Applesoft programs.

You would probably enjoy and learn from a similar relocation project; this article tells you how to go about it. I have phrased the basic guidelines in general terms so that you can apply them to most machine-language programs. PGE, however, affords a concrete example.

You do not have to know much about machine language, either to read this article or to start relocating a program. But you should have read an introduction (such as Don and Kurt Inman's *Apple Machine Language* or Robert Mottola's *Assembly Language Programming for the Apple][)* as well as chapter 3 in your *Apple][Reference Manual.*

Relocating machine language becomes substantially easier and more elegant when you use a disassembler (such as Sourceror) and an assembler (such as Big Mac). But you do not need such programs, you may not own such programs, and you will learn more about machine language without their help. Therefore, this article explains how to relocate a program using only the Monitor in the Apple][+. A subsequent article will tell you how to use Sourceror and Big Mac to facilitate relocation and to improve a relocated program.

Step 1. Investigate the co-resident programs.

You can find challenge enough in modifying one program at a time, and too much challenge in modifying co-resident programs simultaneously. To keep the challenges achievable, you should modify co-resident programs sequentially. Consequently, before choosing a new location for a program, you should find out what memory locations its co-resident programs use.

This investigation offers you opportunities to learn more about how the Apple uses memory space. Acquaint yourself with William Luebbert's book *What's Where in the Apple?* with pages 6-8 and 127-131 of A.P.P.L.E.'s book *All About Applesoft,* and with chapter 8 of Don Worth and Pieter Lechner's book *Beneath Apple DOS.* Although the manuals for programs rarely give memory-usage information, why not look? You may find it useful to draw a map summarizing what you find out.

Since I wanted PGE to butt up against PLE, I had to make sure of PLE's lower limit. The PLE manual includes a memory map, but a rather vague one that left me with several questions. I could expect PLE to use memory locations below $800, for all programs make some use of the first seven pages of memory ($0000-07FF). Moreover, Bongers' relocated PLE set HIMEM = $B900. Since the Applesoft interpreter uses the memory just below HIMEM for string storage, I inferred that the relocated PLE made no use of the space just below $B900. Although my inference happened to be right, my reasoning overlooked the fact that using PLE destroys the values of all Applesoft variables. Do you see the flaw in my reasoning?

Step 2. Find out how the program loads.

A machine-language program often gets loaded by an Applesoft program that you must modify. Although the time to modify the loading program comes later, you ought to examine this program at the outset. In particular, you had better interpret any PEEKs or POKEs.

For example, to load PGE, you run a short Applesoft program named PLE.EDIT.LOAD. This program (a) creates a screen display, (b) BLOADs a machine-language program named PLE.EDIT.PROD, and (c) POKEs several numbers into memory. One group of POKEs puts:

76	**into address 1013**
00	**into address 1014**
135	**into address 1015**

To make sense of these numbers, you have to translate them into hex:

3F5- 4C 00 87 JMP $8700

What's Where in the Apple? or David Lingwood's list on pages 127-131 of *All About Applesoft* will tell you that $3F5-3F7 contains the instruction that is executed when someone enters an ampersand (&). PGE can be activated by entering &, and these POKEs tell the Apple to start executing PGE at location $8700.

PLE.EDIT.LOAD also pokes locations 111, 112, 115, and 116. A little more research discloses that the program is setting HIMEM = $73F0.

Step 3. Load the program and find it.

Load the machine-language program by entering BLOAD PROGRAM. NAME, then enter CALL-151. The asterisk (*) prompt indicates that you are interacting with the Monitor. If you are working with the unrelocated DOS, enter AA60.AA73: the bytes in $AA60-AA61 specify the length of the program you just loaded, and the bytes in $AA72-AA73 specify the address where the program starts. For example, after BLOAD PLE. EDIT.PROD, I found:

```
AA60- 00
AA61- 1C
AA72- 00
AA73- 74
```

These say that the program begins at $7400 and has a length of $1C00, implying that it ends at $8FFF.

Can you verify that ending address? The Monitor will help you make calculations in hex: if you respond to the Monitor prompt by entering a one-byte addition or subtraction problem, the Monitor will tell you the answer. For example,

```
*74+29
=9D
```

But try two bytes: 7400+1C00 or 8FFF-1C00!

If you are working with a relocated DOS, finding your program can be fun. In the December 1981 *Call -A.P.P.L.E.,* Cornelis Bongers said that, after using DOS MOVER, one could find the starting address in $BBFE-BBFF and the length in $BBFC-BBFD. Acting on this information, I ran DOS MOVER, loaded PLE.EDIT.PROD, and looked at the specified addresses. I found:

```
BBFC- D6
BBFD- 60
BBFE- C9
BBFF- 9A
```

These said the program started at $9AC9, was $60D6 bytes long, and extended to $FB9E. These would have been incredible figures even if I had not known what the figures should be: do you see why they have to be wrong? My first conjecture turned out to be right: all of the other DOS MOVER addresses lay between $BF00 and $BFFF, so perhaps BBFC should be BFFC. There they were:

```
BFFC- 00
BFFD- 1C
BFFE- 00
BFFF- 74
```

Some relocated DOSs use other addresses. The Memory Management System sold by Computer Data Services, for instance, puts the DOS transfer instructions in page 3 ($300-3FF); so you ought to look in page 3 for the start and length data. My experience suggests that you would be wise to start by obtaining the correct data from an unmodified DOS, and then to verify these data with the relocated DOS.

Step 4. Search the program for references to addresses outside its own range. (Pass 1 through the program)

You need not study a program before starting to move it. I, for one, lack the patience to do this; and you can relocate a program without digging into many of its details. You will have to comb through the program several times during the relocation process; and if you keep your eyes open, you will learn more about the program during each pass. After several passes, you will discover that you understand a great deal.

Start by searching the program for the answers to a key question: what memory locations does the program use outside its own range? You will recall, for instance, that the original PGE starts in $7400 and extends to $8FFF. But PGE might well use memory locations below $7400 or above $8FFF. In fact, it does both.

After you complete step 3, you have the program in memory, you know where it starts and stops, and you are looking at the Monitor prompt (*). You can list the program by entering its starting address followed by L; for PGE, this would be 7400L. So make that entry, and the computer will disassemble and display the twenty instructions shown in listing 1.

For the time being, you can ignore all two-byte instructions. Focus your attention on the center column which contains just a few numbers: the high-order bytes of addresses in three-byte instructions. The addresses in three-byte instructions fall into three categories:

1. One category is references within the program's range — addresses within $7400-8FFF in the case of PGE. The JMP from $740B to $876A is an example. You can ignore these until the next time you go through the program.
2. You can also ignore for the present instructions that refer to the Monitor, the Applesoft interpreter, DOS, or special addresses. For instance, the instructions at $7403 and $7420 both refer to the Monitor, the instruction at $7408 refers to the keyboard-input buffer, and the instruction at $740E refers to the keyboard strobe. *What's Where in the Apple?* identifies such addresses.

Listing 1

```
7400- 8D E0 92   STA  $92E0
7403- 20 58 FC   JSR  $FC58
7406- A9 CC      LDA  #$CC
7408- 8D 00 02   STA  $0200
740B- 4C 6A 87   JMP  $876A
740E- 2C 10 C0   BIT  $C010
7411- A9 07      LDA  #$07
7413- 85 23      STA  $23
7415- A9 00      LDA  #$00
7417- 8D E0 92   STA  $92E0
741A- 85 25      STA  $25
741C- 85 24      STA  $24
741E- 85 08      STA  $08
7420- 20 C1 FB   JSR  $FBC1
7423- A4 24      LDY  $24
7425- B1 28      LDA  ($28),Y
7427- 85 00      STA  $00
7429- 85 07      STA  $07
742B- 29 3F      AND  #$3F
742D- 09 40      ORA  #$40
```

3. Make a list of the residual category, adding some notes about how the addresses are used. In the above listing, only one address falls into this residual: the instruction at $7400 stores something in $92E0, and $7417 stores a zero in the same location.

To continue to the next group of twenty instructions, just enter L: the Apple will supply the starting address.

Every so often, your Apple will interrupt a listing with three question marks. The triple question marks indicate that the corresponding bytes cannot be interpreted as instructions. You should figure out what these sections of code denote. Here is one example:

Listing 2

```
*
7FE6-  A5 6A     LDA   $6A
7FE8-  85 07     STA   $07
7FEA-  60        RTS
7FEB-  A9 7F     LDA   #$7F
7FED-  EA        NOP
7FEE-  87        ???
7FEF-  4E A5 07  LSR   $07A5
7FF2-  C5 0B     CMP   $0B
7FF4-  90 29     BCC   $801F
```

Notice the RTS in $7FEA: evidently something different starts at $7FEB. What might be the meaning of A9 7F EA 87 4E A5 and so on? And where do the instructions properly resume? In this instance, $7FA9 and $87EA are two addresses, the addresses of instructions. The instructions resume at $7FF0; the programmers apparently preferred to start the next subroutine at an address ending with zero, so the $4E in $7FEF is a meaningless, and confusing space filler.

Because addresses like those in $7FEB–7FEE do not stand out in that prominent center column, I call them imbedded addresses. You should keep a list of the imbedded addresses for later use.

RTS is not the only instruction that ought to tell you to look for the start of something: what other instructions do this?

Here is another example:

Listing 3

```
7C5A-  D0 D2     BNE   $7C2E
7C5C-  CF        ???
7C5D-  C7        ???
7C5E-  D2        ???
7C5F-  C1 CD     CMP   ($CD,X)
7C61-  A0 D4     LDY   #$D4
7C63-  CF        ???
7C64-  CF        ???
7C65-  A0 CC     LDY   #$CC
7C67-  C1 D2     CMP   ($D2,X)
7C69-  C7        ???
7C6A-  C5 A0     CMP   $A0
```

When you encounter series of bytes starting with B, C, or D, you are usually looking at numbers or letters. Can you interpret the above example? See page 8 of the Apple][Reference Manual. (If so much nakedness discomfits you, don the small fig leaf that is presented in the appendix to this article.)

Finally, here is a difficult mystery. PGE includes several sections of this type:

Listing 4

```
8EC6-  4C 00 74  JMP   $7400
8EC9-  30 32     BMI   $8EFD
8ECB-  30 31     BMI   $8EFE
8ECD-  00        BRK
8ECE-  0D B8 15  ORA   $15B8
8ED1-  86 43     STX   $43
8ED3-  4D 50 81  EOR   $8150
8ED6-  23        ???
8ED7-  24 30     BIT   $30
8ED9-  30 00     BMI   $8EDB
8EDB-  0D BD 15  ORA   $15BD
8EDE-  86 42     STX   $42
8EE0-  45 51     EOR   $51
8EE2-  81 4C     STA   ($4C,X)
8EE4-  43        ???
8EE5-  58        CLI
8EE6-  58        CLI
8EE7-  00        BRK
```

I spent hours fruitlessly searching the program for nonexistent references to these addresses. If you like mysteries, tackle this one. But do not think that you ought to be able to solve it. I consulted three professional programmers, none of whom offered an interpretation; and not until after I had successfully relocated PGE did I finally figure out what these sections of the program are. (That is a hint.)

If you own a printer, you may want to print a program listing on which you can scribble notes. You can print the listing while you are making this first pass through the program. Enter Ctrl-C to exit the Monitor, turn on the printer, enter PR#1 to direct output to the printer, and then enter CALL-151 to reenter the Monitor. To stop the printing, enter Ctrl-C, PR#0, CALL-151.

Step 5. Decide how much to move the program.

My search of PGE left me with the following information: First, several instructions said:

Listing 5

```
99 00 90     STA   $9000,Y
BD 00 90     LDA   $9000,X
B9 00 90     LDA   $9000,Y
99 00 91     STA   $9100,Y
BD 00 91     LDA   $9100,X
B9 00 91     LDA   $9100,Y
```

The references to $9100 were usually paired with references to $0200, such as

Listing 6

```
B9 00 91     LDA   $9100,Y
9D 00 02     STA   $0200,X
```

or

Listing 7

```
B9 00 02     LDA   $0200,Y
99 00 91     STA   $9100,Y
```

I deduced that $9000-90FF and $9100–91FF were both one-page storage buffers. Do you see how I drew this conclusion? Second, several instructions referred to addresses from $92D0 to $92FF, but none referred to addresses in $9200–92CF or to addresses above $92FF. Third, I found no addresses below $7400. I remembered, however, that the loading program set HIMEM = $73F0, so I decided to play it safe and to assume that something might be happening in $73F0–73FF.

Since the relocated PLE started at $B900, PGE could extend up to $B8FF; and since the highest address used by PGE was $92FF, the simplest relocation would be to translate $92FF into $B8FF, by adding $2600 to all of the addresses. When relocating a long program, you should avoid changing the low-order bytes of addresses: such changes add a lot of calculations, each calculation creates an opportunity for error, and you stand to gain less than one page (256 bytes).

I lacked the good sense to make the simplest relocation. I had hopes of saving the space occupied by the two buffers in $9000–91FF, the empty space in $9200–92CF, and the storage locations in $92D0–92FF. As Butch Greathouse and Garry Reinhardt originally conceived PGE, these locations took up no effective space because they overlapped the DOS input-output buffers. Thus, I decided to put these addresses below the program rather than above it; that way, I could play with these locations later without having to relocate the entire program. Since the original PGE program extended to $8FFF, I would move this upper boundary right up against PLE. $8FFF would become $B8FF, and each memory location would be shifted by $2900.

At this point, you should make a table of before-and-after addresses, such as this one:

—◉→

DOING IT WITH A NAKED APPLE

74→9D	•	90→9A
75→9E	•	91→9B
76→9F	•	92D0→9CC0
77→A0	•	92D1→9CC1
•	87→B0	•
•	88→B1	•
•	89→B2	92FF→9CEF
	8A→B3	

Step 6. Change the overt addresses. (Pass 2 through the program)

It is time to start changing addresses. Go back to the beginning of the program, list the first twenty instructions, and identify the high-order bytes that occur in the before-and-after table. These include both references within the program range and references outside it, but not references to the Monitor, the Applesoft interpreter, or DOS.

Because people forget to do things when they try to perform several tasks at the same time, you should postpone changing the imbedded addresses until the next pass. During this pass, just concentrate on the addresses which stand out in that center column.

To change a byte, respond to the Monitor prompt by entering the address of the byte, followed by a colon (:), and then the desired byte. For example, one of the instructions in PGE is:

```
740B-    4C 6A 87 JMP $876A
```

The before-and-after table says $87 should become $B0, and $87 is located at address $740D, so I entered:

```
740D:B0
```

You can also change several bytes at a time: enter the desired bytes separated by blanks. For instance, the first instruction in PGE is

```
7400-    8D E0 92 STA $92E0
```

The address table says that $92E0 should become $9CD0, so both the low-order and the high-order bytes have to be changed. Since the low-order byte is located at $7401, I entered:

```
7401:D0 9C
```

After changing several bytes, you should list that block of instructions and verify the changes. It is much quicker and easier to avoid introducing errors than to find them through debugging. So check your work very carefully ... then check it again. You will recover the time this takes several times over when you debug the relocated program.

When you save the modified program, give it a new name so that you do not write over the original program.

Step 7. Change the imbedded addresses. (Pass 3)

You probably identified many of the imbedded addresses during the previous steps. Now is the time to comb the program systematically for them and to change the ones you have found. Besides the triple question marks, look for instructions which store data in $36–39, which is where the Monitor and DOS look for return addresses. Because step 8 also focuses on $36-39, you can save yourself work by marking or noting all of the references to these addresses.

What do you make of the following?

Listing 8

```
8F0C-  A0 00     LDY  #$00
8F0E-  B9 20 8F  LDA  $8F20,Y
8F11-  9D 00 02  STA  $0200,X
8F14-  E8        INX
8F15-  C8        INY
8F16-  C0 0A     CPY  #$0A
8F18-  D0 F4     BNE  $8F0E
8F1A-  20 70 FF  JSR  $FF70
8F1D-  4C 00 87  JMP  $8700
8F20-  A0 CE     LDY  #$CE
8F22-  A0 B8     LDY  #$B8
8F24-  B7        ???
8F25-  B0 B0     BCS  $8ED7
8F27-  C7        ???
8F28-  87        ???
8F29-  A0 20     LDY  #$20
8F2B-  70 FF     BVS  $8F2C
```

Step 8. If you are adapting the program to a relocated DOS, change the references to DOS. (Pass 4)

Moving DOS into a 16K card obviously becomes a stimulus for relocating machine-language programs. If you are responding to this stimulus, you must adapt the program to the relocated DOS. You can omit this step if you are relocating a program which already operates correctly with the DOS you intend to use.

DOS references come in two delightful varieties: direct and indirect. Both are easy to find. The direct references stick out into that center column: you only have to look for addresses in the range $9D00–BFFF. The indirect references go through $36–39, so you examine instructions that store data in these locations.

Sometimes you can merely change the DOS addresses, but sometimes you have to add some instructions. Which of these you should do depends on the specific address in DOS and on the program you use to relocate DOS.

DOS MOVER illustrates the issues; see pages 9–10 of the August 1981 *Call –A.P.P.L.E.* If you run DOS MOVER and then list $BF00-BFFF, you will find numerous JMPs and JSRs that are mixed with references to $C081 and $C083. Instructions that mention $C083 twice activate the 16K card, and Bongers created a subroutine at $BF66 that mentions $C083 twice. Instructions that mention $C081 de-activate the 16K card. Thus, JSR $9E81 should become JSR $BF93:

Listing 9

The Original Instructions

```
BF93— 20 66 BF  JSR $BF66 ;activate card
BF96— 20 81 DE  JSR $DE81 ;execute the
                DOS subroutine starting
                at $DE81 (which was
                orginally $9E81)
BF99— 8D 81 C0  STA $C081 ;deactivate
                card
BF9C—60         RTS
```

Because DOS MOVER provides the instructions I needed, I could modify the following instructions from PGE by changing only four bytes:

Listing 10

The Modified Instructions

```
808C-  A9 BD    LDA #$BD ;change BD to
                9D
808E-  85 36    STA $36
8090-  A9 9E    LDA #$9E ;change 9E to
                BF
8092-  85 37    STA $37
8094-  A9 81    LDA #$81 ;change 81 to
                93
8096-  85 38    STA $38
8098-  A9 9E    LDA #$9E ;change 9E to
                BF
809A-  85 39    STA $39
```

On the other hand, the following instructions required a bit of programming:

Listing 10a

```
80E8-  A9 F2     LDA  #$F2
80EA-  8D 60 9D  STA  $9D60
80ED-  8D 5E 9D  STA  $9D5E
80F0-  A9 D4     LDA  #$D4
80F2-  8D 61 9D  STA  $9D61
80F5-  8D 5F 9D  STA  $9D5F
80F8-  AD 3D 81  LDA  $813D
```

```
80E8-  20 66 BF  JSR  $BF66
80EB-  A9 F2     LDA  #$F2
80ED-  8D 60 DD  STA  $DD60
80F0-  8D 5E DD  STA  $DD5E
80F3-  A9 D4     LDA  #$D4
80F5-  4C 7C AC  JMP  $AC7C
80F8-  AD 3D AA  LDA  $AA3D
```

```
837C- 8D 61 DD  STA   $DD61
837F- 8D 5F DD  STA   $DD5F
8382- 8D 81 C0  STA   $C081
8385- 4C F8 A9  JMP   $A9F8
```

$837C–8388 was unused space. Do you understand why I did what I did?

Step 9. BSAVE the modified program.

First, if you have not already done so, give the modified program a different name from the original program.

Second, BSAVE the modified program. Since the program is still in its original location, specify the original starting address, or specify a slightly modified address if you added some instructions at the lower end. Also increase the length parameter to allow for any instructions you added.

Third, BLOAD the modified program, specifying the desired starting address and length. This shifts the program to its new location.

Fourth, BSAVE the program again, using the new starting address and length. Now the program will go into its new location automatically when you BLOAD it.

Step 10. Modify the loading program.

Load, list, and modify the Applesoft loading program to reflect the new addresses. You will likely have to make three types of changes:

a) the program's name in a BLOAD instruction such as PRINT CHR$(4)"BLOAD PROGRAM.NAME",
b) PEEKs and POKEs, and
c) screen displays such as PRINT"CALL 34567" or PRINT"PROGRAM.NAME".

Step 11. Debug! (Passes 5, 6, ...)

If you expect the modified program to run properly, you are an optimist. You probably omitted changes you ought to have made, and you may have introduced typographic errors. Moreover, because it is virtually impossible to excise all of the errors from a long program, the program with which you started may incorporate invisible errors; and relocating the program may cause these errors to manifest themselves.

How could relocation reveal previously invisible errors? Again, PGE provides an example. The instructions in $8E0F–8E1A read as follows:

Listing 11

```
8E0F-C9 EA     CMP   #$BA
8E11-90 03     BCC   $8E16
8E13-4C 46 89  JMP   $8946
8E16-29 7F     AND   #$7F
8E18-99 00 02  STA   $0200,Y
```

However, in two places ($75EC and $8FCB), PGE states:

```
4C 14 8E        JMP $8E14
```

The programmers intended to say JMP $8E16, but they got one digit wrong, and created a jump to the middle of an instruction. This glitch produced no problems while PGE occupied its original location: when the Apple jumped to $8E14, it found

```
46 89           LSR $89
```

so the Apple proceeded to $89 and shifted the bits right, then went on to the instruction in $8E16, which is where it should have gone in the first place. The glitch merely shifted the bits in $89, and this had no visible effect because the Applesoft interpreter only uses $89 for temporary storage. However, when I shifted PGE upward, the instruction in $8E13 became

```
B713-   4C 46 B2   JMP $B246
```

and when the Apple jumped to $B714, it found:

```
        46 B2      LSR $B2
```

This relocated LSR had very visible effects because $B2 is part of CHRGET, an important subroutine in the Applesoft interpreter. The relocated LSR actually disabled CHRGET: can you explain why? (For an explanation of CHRGET, see Cornelis Bongers' article in the March 1982 *Call –A.P.P.L.E.)*

I enjoyed finding and understanding that glitch, and more generally I enjoy debugging. You too will enjoy debugging if you treat it as an intellectual challenge and develop some skill at it. Debugging strongly resembles an adventure game, a game that Sherlock Holmes would love. You look for clues, you make conjectures about the clues' significance, and you test your conjectures. But debugging frustrates a lot of people because they do not know how to do it well.

This is no place for a treatise, but you can take much of the pain out of debugging by obeying two fundamental rules:

1. Decompose the task.
2. Let the computer do the work.

Break the program into autonomous sections, and debug one section at a time. For example, PGE responds to various one-key commands. The commands *, !, and % direct the Apple to a short section at the very end of the program that makes some simple calculations. So I started debugging with this section, where the difficulties would be minimal. I gave only these three commands until this section worked properly. Then I looked for another command which activates an autonomous section of the program.

A map of the program will help you decide what to debug in what sequence. Examine the instructions following the program's entry point ($8700 in the original PGE, $B000 in the relocated PGE). This initial section usually incorporates JSRs and JMPs that identify the starting points of major subroutines. Then examine the instructions following the entry point of each major subroutine, continuing until you see how that subroutine terminates: does the subroutine interact with others or is it autonomous? After you inspect all of the major subroutines, you should be able to classify the subroutines hierarchically. If you find flow diagrams helpful, draw one.

When you are trying to locate a specific defect, do not search randomly. Since very small defects can produce large effects, you may be searching for a needle in a haystack. Develop a systematic search procedure that makes your Apple locate the defect for you. For example, divide the section you are debugging in half, by inserting a jump, and then run half. If the first half works properly, the defect must lie in the other half. Also use your Apple to generate evidence about the defect's character: vary the inputs to the program and see what happens to the outputs.

Your detective work can benefit from a fundamental assumption:

The computer acts logically.

Poor Sherlock Holmes had to contend with the vague and erratic logic of human beings. You do not, and you can take advantage of this fact. Every response your Apple makes has a precise and specific stimulus: when your Apple takes an undesirable action, it is responding to an undesirable stimulus. So use logic to develop conjectures about the stimulus: ask yourself what kinds of instructions could produce the undesirable action. —

Step 12. Make improvements.

By the time you finish debugging the program, you will know a great deal about it. So use the opportunity to improve the program. Your improvements might make the program work significantly better, and so be pragmatically useful. An equally important outcome is your personal sense of accomplishment. Of the changes I made in PGE, for example, the ones which please me most do not alter the program's actions.

Appendix

Here is FIG.LEAF, a machine-language program that will help you interpret those perplexing sections of programs. The disassembler built into your Apple assumes that every byte in memory ought to be interpreted as an instruction code or address; when this assumption fails, the disassembler burps three question marks. FIG.LEAF makes the opposite assumption: that every byte ought to be interpreted as part of a message in ASCII code. In effect, FIG.LEAF automates the table on page 8 of your Reference Manual. BLOAD FIG.LEAF before you begin Step 4. Then, when you encounter a perplexing section, respond to the Monitor prompt by entering 300G.

FIG.LEAF distorts the contents of memory in two ways. Because flashing characters interfere with your perception of non-flashing characters, FIG.LEAF converts flashing characters to inverse. And because Bell ($87), Backspace ($88), Linefeed ($8A), and Carriage Return ($8D) produce irregular lines and distracting beeps, FIG.LEAF replaces some control codes with inverse exclamation points. These control codes often inhabit messages, so you will find that inverse exclamation points likely go together with any adjacent words.

Insert FIG.LEAF into your machine by entering an address, a colon, and some bytes separated by commas. For example,

```
300:A0 FF C8 B9 86 03 20 F6 FD
C9 BA D0 F5 20 6F FD
```

You can enter up to 85 bytes before pressing Return. After you have entered the entire program, proofread it carefully for typographic errors. When you are sure that the program is correct, BSAVE FIG.LEAF, A$0300, L$00C9. Finally, BRUN FIG.LEAF to see what it does. If you tell it to start at $300, FIG.LEAF will look at itself.

FIG.LEAF can also help you in other circumstances. For example, FIG.LEAF highlights the structure of data that have been dumped from a disk, and it renders Applewriter files intelligible.

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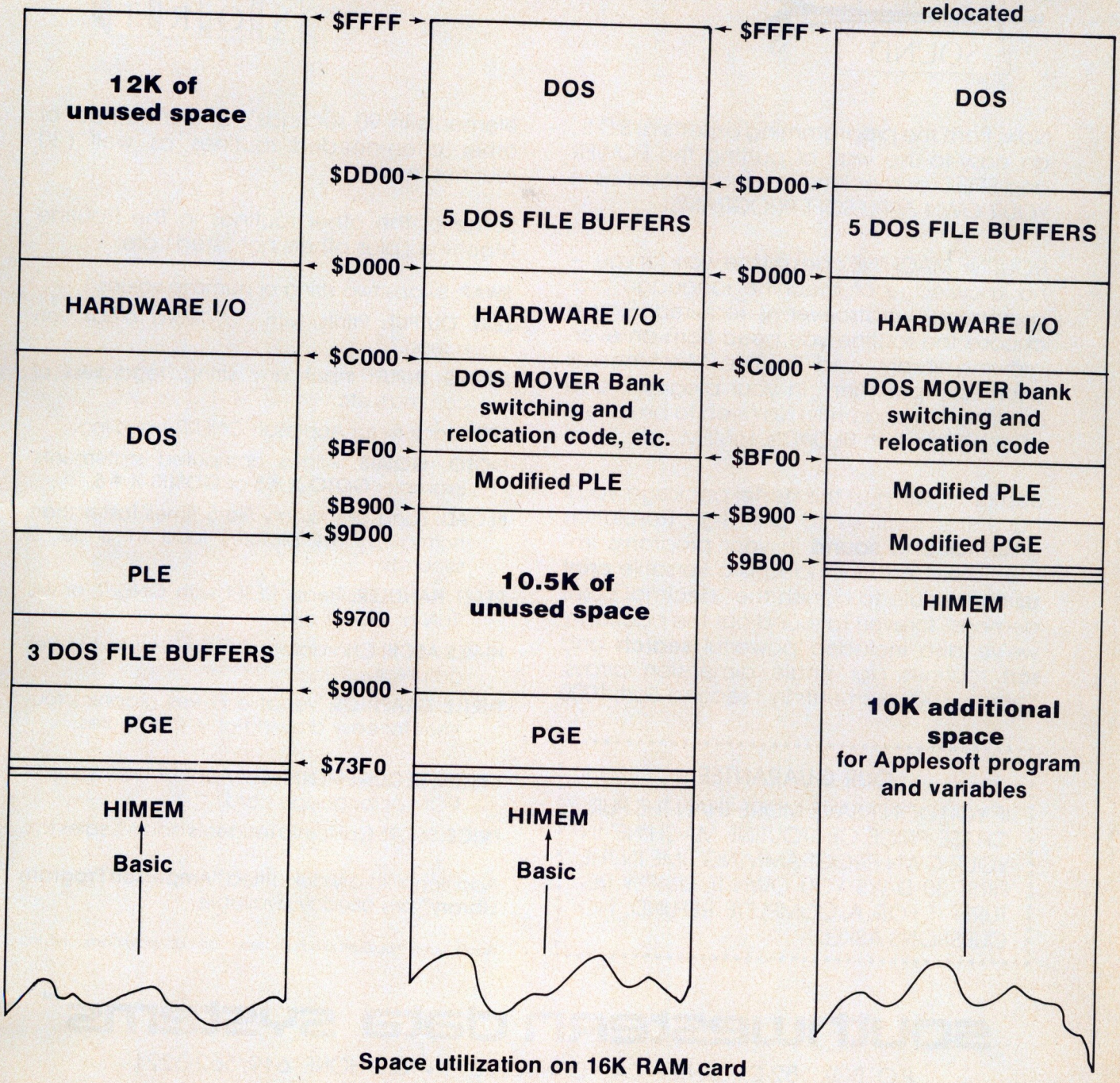
FIG.LEAF hex dump

```
*300.3C8
0300- A0 FF C8 B9 86 03 20 F6
0308- FD C9 BA D0 F5 20 6F FD
0310- 20 C7 FF 20 A7 FF 20 58
0318- FC 20 59 03 20 92 FD A9
0320- A0 20 F6 FD A0 00 20 59
0328- 03 B1 3C C9 8E B0 15 C9
0330- 40 90 11 C9 80 B0 07 E9
0338- 40 18 90 08 F0 C2 C9 87
0340- 90 02 A9 21 20 F6 FD C8
0348- A5 24 D0 DA 18 98 65 3C
0350- 85 3C 90 C5 E6 3D 18 90
0358- C0 A5 25 C9 16 B0 01 60
0360- 68 68 A0 FF C8 B9 A2 03
0368- 20 F6 FD C9 BA D0 F5 20
0370- 0C FD 48 20 58 FC 68 C9
0378- C3 F0 A1 C9 CE F0 BD C9
0380- D1 D0 DD 4C 69 FF 8D C5
0388- CE D4 C5 D2 A0 C6 C9 D2
0390- D3 D4 A0 C1 C4 C4 D2 C5
0398- D3 D3 A0 C9 CE A0 C8 C5
03A0- D8 BA 8D C3 A0 BD A0 C3
03A8- CF CE D4 C9 CE D5 C5 BB
03B0- A0 CE A0 BD A0 CE C5 D7
03B8- A0 D3 D4 C1 D2 D4 BB A0
03C0- D1 A0 BD A0 D1 D5 C9 D4
03C8- BA
```

Figure 1-A
Before DOS Mover

Figure 1-B
After DOS Mover,
with PLE relocated

Figure 1-C
After DOS Mover,
with PLE and PGE
relocated



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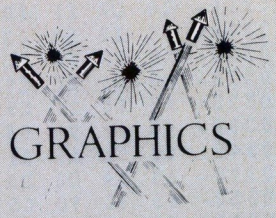

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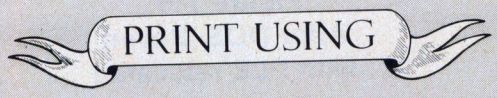

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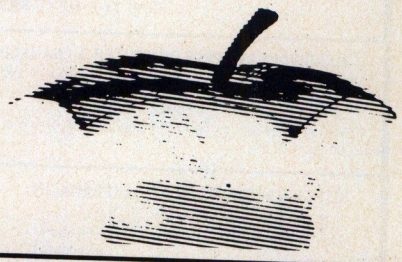
FROM THE VERY CORE OF APPLE:

The Unknown INTFLG



Kelly W. Puckett

THIS note describes a previously undocumented Applesoft flag and shows how that flag may be used when manipulating Applesoft variables from machine language programs.

The subroutines and flags used here, and their names, are documented in John Crossley's wonderful article, 'Applesoft Internal Entry Points'. *Call -A.P.P.L.E. in Depth 1: All About Applesoft*

There are many occasions when it is desirable or necessary to use an Applesoft variable from a machine language routine. If the variable type — string, integer, real — is known in advance, the method is simple. When the Applesoft textpointer (TXTPTR) is pointing to the name of the variable, the PTRGET subroutine is executed. This subroutine returns with the address of the variable in the A and Y registers and in VARPNT. The machine language program can then do whatever is desired with the value of the variable.

What do you do when you cannot know ahead of time the type of variable PTRGET is going to locate? After executing PTRGET, the Applesoft flag VALTYP ($11) may be tested to determine whether the variable was string or numeric. If it was a string variable, VALTYP will contain $FF. If the variable was a real or an integer variable, VALTYP will contain $00.

But how can you tell whether the variable was an integer type or a real type variable? The existing information on Applesoft's internal subroutines and flags does not offer a single clue to a method.

Clearly Applesoft must be able to tell the difference in order to store and retrieve numeric variables correctly, because the internal representations of the two numeric types are very, very different.

While working on a machine language program which must manipulate all types of Applesoft variables, I discovered another zero page flag set by PTRGET. The flag, which is known as INTFLG, is at $12. If the variable addressed by PTRGET was a real or string variable, INTFLG is left with a value of $00. If the variable was an integer, INTFLG will contain $80.

Testing both variable type flags, VALTYP and INTFLG, will completely determine the type of variable encountered.

The values of the two flags may be added together and saved for later use in a single byte of memory:

Variable	VALTYP	INTFLG	SUM
String	$FF	$00	$FF
Real	$00	$00	$00
Integer	$00	$80	$80

Here is a routine which will locate the variable, and, if the variable is numeric, load the value of the variable into the floating point register, FAC:

Knowing about and using INTFLG will enhance your ability to manipulate numeric Applesoft variables from machine language routines.

```
                         ********************************
                         *                              *
                         * Vartype Finder-Kelly Puckett *
                         *                              *
                         * Call -A.P.P.L.E. : Dec. 1982 *
                         *                              *
                         ********************************
                         *
VALTYP          =        $11
INTFLG          =        $12
VARPNT          =        $83
PTRGET          =        $DFE3
GIVAYF          =        $E2F2
MOVFM           =        $EAF9
                *
                         ORG     $300
                *
0300: 20 E3 DF           JSR     PTRGET          ;Locate variable
0303: 24 11              BIT     VALTYP          ;string or numeric
0305: 10 01              BPL     LOADNUM         ;Branch if numeric
0307: 60                 RTS                     ;Return if string
0308: 24 12     LOADNUM  BIT     INTFLG          ;Real or integer
030A: 30 03              BMI     LOADINT         ;Branch if integer
030C: 4C F9 EA           JMP     MOVFM           ;Value -> FAC
030F: A0 00     LOADINT  LDY     #$00            ;Set index
0311: B1 83              LDA     (VARPNT),Y      ;1st byte of value
0313: AA                 TAX                     ;Save it in X reg
0314: C8                 INY                     ;Index =1
0315: B1 83              LDA     (VARPNT),Y      ;2nd byte of value
0317: A8                 TAY                     ;Put it in Y reg
0318: 8A                 TXA                     ;1st byte in Acc
0319: 4C F2 E2           JMP     GIVAYF          ;A,Y -> FAC

--End assembly--

28 bytes

Errors: 0
```

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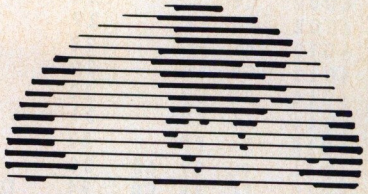
EXPLORING THE WORLD OF APPLE:

New Uses For the RAM Card

Mark Harris



WITH the cost of memory plummetting all the time, 16K "language cards" for the Apple have become increasingly affordable (I have seen one model priced at $50). Can you make use of the extra memory? One obvious use for the card is for loading languages: for example, the System Master diskette will automatically load Integer Basic into the card when booted. Programs and articles have appeared which allow DOS to be loaded into the language card, freeing the space otherwise occupied in primary memory. But the extra 16K is hard for a beginner to get to: the added memory cannot be addressed (PEEKed, POKEd, etc.) directly without "bank-switching." The purpose of this article is to demonstrate some additional uses of the language card.

The Apple] [is built around the 6502 microprocessor. This chip has 16 address lines, and hence directly-addressable memory is limited to 2↑16 = 65536 bytes (64K). Additional memory can be accessed through a technique called "bank-switching"; by flipping a (soft) switch, the user can "look at" a different bank of memory, but never more than 64K at one time. The 16K card replaces the top $3000 (12288 decimal) bytes of ROM (Applesoft and the Monitor on most systems) with $4000 (16384) bytes of RAM (only $3000 of which is directly available without further switching). The important thing to keep in mind when programming for such a card is that Applesoft and Monitor routines should never be called when the usual ROM has been switched out – havoc would result from such calls. This limits the user (temporarily) to 6502 machine language. One good use of the extra space is for moving a large block of memory to or from the card, since a very short machine language program can perform the move and then return to a controlling BASIC program. The "LC PAGE 2 BACKUP" routine and its BASIC driver "PICTURE MOVE" listed below give an example of this technique.

Read vs. Write Operations

Before we plunge into the intricacies of the language card, let's distinguish between read and write operations. In BASIC, the statement X = PEEK(800) *reads* a value from (decimal) address 800 and assigns it to X. The statement POKE 800,128 *writes* the decimal value 128 into address 800. Examples of machine language read and write instructions are LDA $6000, which reads a value from (hex) address $6000 into the accumulator, and STA $6000, which writes the contents of the accumulator to address $6000. Reading is done implicitly when an instruction is fetched from memory; for example, JSR $6000 causes the instruction sequence beginning at address $6000 to be read and executed.

When more than one bank of memory with the same range of addresses is available, reading and writing to a bank are independent operations: it is possible to read from address $F000 in one bank but write to $F000 in another. In fact, when you power-up or reset your Apple, reading the range $D000 – FFFF will "look at" the motherboard ROM (Applesoft and the Monitor on an Apple] [+), while writing in the same range is done in bank 2 (described below) of the language card. If at this point you BLOAD a file to an address in this range, the file will be stored in the language card, but PEEK's to the loaded addresses will just return the contents of ROM. To make use of the file you just loaded, some bank-switching gymnastics are required.

How to Access the Language Card

The memory in the language card consists of addresses $E000 – FFFF, and two banks of memory $D000 – DFFF. Either bank can be enabled

```
:ASM
                    ********************************
                    *                              *
                    *       LC PAGE 2 BACKUP       *
                    *                              *
                    *        By Mark Harris        *
                    *           7/11/82            *
                    *                              *
                    * Call -A.P.P.L.E. : Dec. 1982 *
                    *                              *
                    * CALL BACKUP = $6000 to put   *
                    * picture (pg 2) in language   *
                    * card, OR RESTORE = $6021     *
                    * to restore picture to pg 2.  *
                    *                              *
                    ********************************

                            ORG  $6000

                    * Backup picture from page 2 to LC

6000: 2C 89 C0      BACKUP   BIT  $C089
```

NEW USES FOR THE RAM CARD

```
6003: 2C 89 C0   22           BIT  $C089      ;Write-enable LC (bank 1)
6006: 20 3B 60   23           JSR  INIT
6009: B1 FC      24   LP1      LDA  ($FC),Y
600B: 91 FE      25           STA  ($FE),Y
600D: C8         26           INY
600E: D0 F9      27           BNE  LP1
6010: A5 FD      28           LDA  $FD
6012: C9 5F      29           CMP  #$5F
6014: F0 07      30           BEQ  DONE
6016: E6 FD      31           INC  $FD
6018: E6 FF      32           INC  $FF
601A: 4C 09 60   33           JMP  LP1
601D: 2C 8A C0   34   DONE     BIT  $C08A      ;Read ROM, W protect LC
6020: 60         35           RTS
                 36
                 37   * Restore picture from LC to page 2:
                 38
6021: 2C 8B C0   39   RESTORE  BIT  $C08B      ;LC read (bank 1)
6024: 20 3B 60   40           JSR  INIT
6027: B1 FE      41   LP2      LDA  ($FE),Y
6029: 91 FC      42           STA  ($FC),Y
602B: C8         43           INY
602C: D0 F9      44           BNE  LP2
602E: A5 FF      45           LDA  $FF
6030: C9 FF      46           CMP  #$FF
6032: F0 E9      47           BEQ  DONE
6034: E6 FD      48           INC  $FD
6036: E6 FF      49           INC  $FF
6038: 4C 27 60   50           JMP  LP2
603B: A9 00      51   INIT     LDA  #0
603D: A8         52           TAY
603E: 85 FC      53           STA  $FC
6040: 85 FE      54           STA  $FE
6042: A9 40      55           LDA  #$40
6044: 85 FD      56           STA  $FD
6046: A9 E0      57           LDA  #$E0
6048: 85 FF      58           STA  $FF
604A: 60         59           RTS

--End assembly--  75 bytes    Errors: 0
```

```
]LIST

10  REM *** PICTURE
      MOVE ***
20  PRINT  CHR$ (4)"BLOAD
      LC PAGE 2 BACKUP"
30  HGR2 : HCOLOR= 3:
      HPLOT 50,50 TO
      250,50 TO 250,150
      TO 50,150 TO 50,50:
      REM DRAW RECTANGLE
40  CALL 24576: REM
      BACK UP PICTURE
50  HGR2 : REM  ERASE
      PICTURE
60  GET A$: REM WAIT
      FOR KEYPRESS
70  CALL 24609: REM
      RESTORE PICTURE
```

for reading and/or writing by referencing certain addresses. These are as follows:

	Bank 1 references. Read ROM	Read RAM
Write enable (2 references)	$C089 (–16247)	$C08B (–16245)
Write protect	$C08A (–16246)	$C088 (–16248)
	Bank 2 references. Read ROM	Read RAM
Write enable (2 references)	$C081 (–16255)	$C083 (–16253)
Write protect	$C082 (–16254)	$C080 (–16256)

For example, to read the Apple ROM (Applesoft and Monitor in the Apple] [+) and write-protect language card RAM, bank 1, the instruction STA $C08A could be used. (LDA instead of STA is OK, but loses the contents of the accumulator. BIT may also be used, but can change the status register flags.) In this state the instruction STA $D000 would have no effect, since no RAM with that address is enabled. To read ROM and write-enable bank 2 RAM, the pair of instructions BIT $C081, BIT $C081 would work. In this state, LDA $D000 would load the accumulator with the contents of that address in the motherboard ROM, while STA $D000 would store the contents of the accumulator in bank 2 RAM. Note: If additional code separates the two references to $C081, the same state will be set after the second BIT $C081 so long as no write-protecting takes place in between. In fact, whenever any two write-enables (even to different banks) take place without intervening write-protects, the effect will be the same as a double-reference to the last address.

The LC PAGE 2 BACKUP Program

LC PAGE 2 BACKUP is a short machine-language routine which will copy a high-resolution graph (page two) to or from addresses $E000 – FFFF in the language card. The entry point for backing up a picture is BACKUP = $6000 (24576 decimal), and that for restoring the picture is RESTORE = $6021 (24609). (Note that since the range $E000 – FFFF used in the program is unique in the language card, it doesn't make any difference whether bank 1 or 2 is enabled.) One use for the program would be to create an image on Hi-Res page 2, back it up, alter it and save the new graph to disk, then restore the original for further alterations. Of course the same objective could be accomplished using the Apple's own memory rather than that in the language card, but this only an illustration. The method demonstrated can be applied to many situations in which block moves are desirable.

How to Enter and Save Binary Files

The numbers on the far left of the assembly listing are hexadecimal addresses, and the numbers immediately to the right are the contents of those addresses. To enter, get into the Monitor (CALL -151) and type "6000:." Now type the contents, "AD 89 C0 AD 89 C0 20 ...." You can enter up to 85 bytes before overflow occurs; before you have typed this many, hit return and continue with a colon and more data. This entire routine could be entered by typing:

```
6000:2C 89 C0 2C 89 C0 20 3B
: 60 B1 FC 91 FE C8 D0 F9
: A5 FD C9 5F F0 07 E6 FD
: E6 FF 4C 09 60 2C 8A C0
: 60 2C 8B C0 20 3B 60 B1
: FE 91 FC C8 D0 F9 A5 FF
: C9 FF F0 E9 E6 FD E6 FF
: 4C 27 60 A9 00 A8 85 FC
: 85 FE A9 40 85 FD A9 E0
: 85 FF 60
```

To save the program, you need the starting address and length of the file. These are $6000 and $4B (75 decimal), respectively. Assuming you are back in BASIC (press [Ctrl-C] [return] from the Monitor) and have your disk drive ready, type "BSAVE LC PAGE 2 BACKUP,A$6000, L$4B." The following Applesoft program "PICTURE MOVE" illustrates the use of the routine you just saved by drawing a picture on Hi-Res page two, duplicating it in the language card, erasing page two, then restoring the picture. (See boxed listing on previous page).

Getting Fancy

The procedure just illustrated for moving data in and out of the language card is fairly straightforward. Locating subroutines in the added memory is more involved, but generally more useful. This is particularly desirable during program development, when utility routines can be placed in the extra memory without interfering with test runs of the program. In this application, the card need not be present for the finished product (the program being developed) to run. (I write most of my programs to run on Apples less fortunate than my own.) The new Program Global Line Editor, available from *A.P.P.L.E.*, uses the language card in this way.

If the subroutine to be placed in the language card contains no calls to ROM addresses $D000 - FFFF, the task of linking it to a driver program is easy. Assuming for example that the subroutine begins in bank 2 RAM at $D000, the calling (machine language) program could simply address $C083 twice to read-and write-enable the RAM, call the routine, then address $C082 to read the motherboard ROM and to write-protect RAM. To get your routine in the language card in the first place, you can BLOAD it there if the card has been write-enabled. The program OVERLAY illustrates this technique. When loaded at $D000 (bank 2 RAM) and called by the short driver OVERLAY DRIVER, this subroutine overlays the picture currently on high-resolution page 2 onto the picture on page 1 (without disturbing the contents of page 2). To try out the program, key in and BSAVE OVERLAY at a lower address, say $6000, then use the

```
:ASM
                    ********************************
                    *                              *
                    *          OVERLAY             *
                    *                              *
                    * A subroutine to overlay page *
                    * two picture onto page one.   *
                    * Load into language card and  *
                    * call from a machine language *
                    * program by                   *
                    *      STA $C080 ;Read bank 2  *
                    *      JSR $D000               *
                    * After return from subroutine *
                    * read ROM by STA $C082        *
                    *                              *
                    ********************************

                          ORG   $D000
                    *
                    PG1   EQU   $FC
                    PG2   EQU   $FE
D000:  A0 00              LDY   #0        ;Set up hi-res
D002:  84 FC              STY   PG1       ;pointers
D004:  84 FE              STY   PG2
D006:  A9 20              LDA   #$20
D008:  85 FD              STA   PG1+1
D00A:  A9 40              LDA   #$40
D00C:  85 FF              STA   PG2+1
D00E:  B1 FC        LOOP  LDA   (PG1),Y  ;"OR" corresponding
D010:  11 FE              ORA   (PG2),Y  ;bytes from page
D012:  91 FC              STA   (PG1),Y  ;one and two,
D014:  E6 FC              INC   PG1      ;store in page one
D016:  E6 FE              INC   PG2
D018:  D0 F4              BNE   LOOP
D01A:  E6 FD              INC   PG1+1
D01C:  E6 FF              INC   PG2+1
D01E:  A5 FD              LDA   PG1+1
D020:  C9 40              CMP   #$40
D022:  D0 EA              BNE   LOOP
D024:  60                 RTS
 --End assembly-- 37 bytes     Errors: 0

:ASM
                    ********************************
                    *                              *
                    *       OVERLAY DRIVER         *
                    *                              *
                    * Load OVERLAY at $D000 bank 2 *
                    * RAM, then BRUN this program. *
                    *                              *
                    ********************************

                          ORG   $6000
                    *
6000:  8D 80 C0           STA   $C080   ;Read bank 2 RAM
6003:  20 00 D0           JSR   $D000   ;Call OVERLAY
6006:  8D 82 C0           STA   $C082   ;Read ROM
6009:  8D 50 C0           STA   $C050   ;Display page
600C:  8D 52 C0           STA   $C052   ;two hi-res
600F:  8D 54 C0           STA   $C054   ;graphics
6012:  8D 57 C0           STA   $C057
6015:  4C D0 03           JMP   $3D0    ;Exit to BASIC

--End assembly--    24 bytes       Errors: 0
```

NEW USES FOR THE RAM CARD

A(ddress) parameter in BLOAD to move it to $D000 (see MESSAGE DRIVER below). Key in and BSAVE OVERLAY DRIVER at the addresses given in the assembly, then with pictures of your choice in Hi-Res pages 1 and 2, BRUN OVERLAY DRIVER. The combined images will be displayed on page 1. (Type "TEXT" to continue.)

Things get more complicated if the subroutine contains references to ROM $D000 - FFFF: an obvious conflict results. One way around the problem is to have the subroutine in the language card pass the address of the desired ROM routine to a short segment in primary RAM (below $D000), which in turn calls the routine and then returns to the language card. An assembly of such a segment, "INDIRECT LC CALL," is given below. If this code is placed at address $300, then a language card routine at $D000 (bank 2) can be called by a JSR $300, which will read-and write-enable RAM (bank 2) before entering the routine. The language card routine can in turn call (for example) the COUT subroutine (output a character) at $FDED in ROM by pushing the contents of the accumulator and the address $FDED onto the stack and executing a JSR $30D as follows:

```
PHA
LDA $FD
PHA
LDA $ED
PHA
JSR $30D
```

If you have a macro-assembler (such as Big Mac), you can define a short macro so that ">>> CALL COUT" will insert the above code during the assembly, thus making the bank-switching relatively invisible.

As an example of this indirect approach, let's try printing a simple message from a routine in the language card by calling COUT in the Monitor ROM. The BASIC program MESSAGE DRIVER will load such a routine, PRINT MESSAGE, into the language card and call it via INDIRECT LC CALL. (You must first BSAVE PRINT MESSAGE from a lower address, as was done with OVERLAY.) When MESSAGE DRIVER is run, the sentence "THIS IS A TEST." will print on the screen. Not very flashy, but any subroutine in Applesoft or the Monitor can be accessed in the same way.

```
]LIST

10  REM *** MESSAGE
      DRIVER ***
20 X =  PEEK ( - 16255):X
    =  PEEK ( - 16255):
    REM WRITE-ENABLE
    BANK 2 BUT READ
    ROM (POWER-UP
    STATE)
30  PRINT  CHR$ (4)"BLOAD
    PRINT MESSAGE,A$D000"
40  CALL 768: REM PRINT
    MESSAGE
```

```
:ASM

                        ********************************
                        *                              *
                        *      INDIRECT LC CALL        *
                        *                              *
                        *       By Mark Harris         *
                        *                              *
                        * Call -A.P.P.L.E. : Dec. 1982 *
                        *                              *
                        * JSR $300 to enter subroutine *
                        * at $D000 (bank 2) in lang/cd *
                        * ROM calls from LC routine    *
                        * must be done indirectly      *
                        * using the following code:    *
                        *                              *
                        *    PHA                       *
                        *    LDA #)SBR   ;High byte of *
                        *                ;SBR address  *
                        *    PHA                       *
                        *    LDA #(SBR   ;Low byte     *
                        *    PHA                       *
                        *    JSR $30D                  *
                        *                              *
                        ********************************

                                ORG   $300
                        *
0300: 8D 83 C0                  STA   $C083  ;Read RAM bank 2, write enable
0303: 8D 83 C0                  STA   $C083
0306: 20 00 D0                  JSR   $D000  ;Routine in l.c.
0309: 8D 81 C0                  STA   $C081  ;Read ROM
030C: 60                        RTS
030D: 68                INDCLL  PLA
030E: 8D 33 03                  STA   RTAD+1
0311: 68                        PLA
0312: 8D 34 03                  STA   RTAD+2
0315: EE 33 03                  INC   RTAD+1
0318: D0 03                     BNE   L1
031A: EE 34 03                  INC   RTAD+2
031D: 68                L1      PLA
031E: 8D 2A 03                  STA   SBR+1
0321: 68                        PLA
0322: 8D 2B 03                  STA   SBR+2
0325: 68                        PLA
0326: 8D 81 C0                  STA   $C081
0329: 20 FF FF          SBR     JSR   $FFFF  ;This adr gets changed to sbr originally called
032C: 8D 83 C0                  STA   $C083
032F: 8D 83 C0                  STA   $C083
0332: 4C FF FF          RTAD    JMP   $FFFF  ;Gets changed to return adr in lc program


--End assembly--        53 bytes    Errors: 0
```

I decided to really put this approach to the test by putting the RENUMBER program from the System Master diskette into the language card. It took a while, but it worked, and I now have a nice program-development tool which isn't clobbered by FP or by tampering with HIMEM, and which doesn't invade memory craved by the program I'm working on. Here is how I did it:

I first ran RENUMBER to get the machine-language program in its proper place in memory ($8E00 – 95FF). I then disassembled the routine using the program SOURCEROR from the Big Mac diskette (there are a number of such magnificent bonuses on the disk – I have found Big Mac to be an outrageous bargain). All external references were listed at the bottom of the disassembly, and the next task was to fix the ROM calls by the method described above. A couple of additional (but direct) steps were necessary because of a JMP rather than JSR to a ROM address in the routine. Finally, I changed the start (ORG) of the routine and re-assembled.

An Alternative Approach.

If the routine(s) placed in the language card make frequent calls to the Monitor in ROM, it may be worth putting a copy of the Monitor ($F800 – FFFF) into the card. This will speed up your program by eliminating bank-switching during Monitor calls. Only one-eighth of the card is sacrificed to this duplication of code, and the Monitor will be available in RAM as long as the power stays on and you don't write over it.

Conclusion

Chances are that you can get more mileage out of your language card than you've been getting. Practicing some of the techniques described above will suggest uses of your own. In Part 2 of this article, which will appear in our companion publication: *Call —A.P.P.L.E. in Depth*, issue 3: *All About DOS*, I'll present a disk-backup program that uses the language card to speed up the copy process.

Bibliography

[1] *D. Worth & P. Lechner, Beneath Apple DOS, Quality Software, Reseda, CA 1981.*

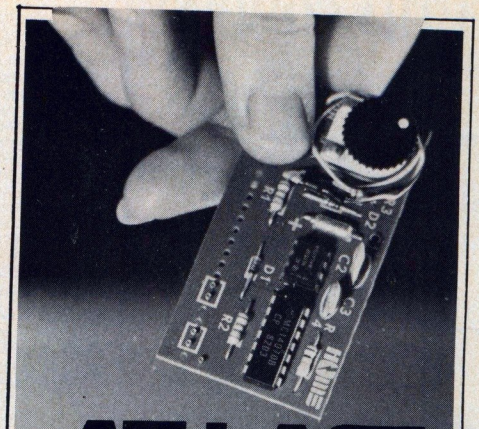
[2] *W. Leubbert, What's Where in the Apple?, Micro Ink, Inc., Chelmsford, MA, 1981.*

(Both of the above are available to A.P.P.L.E. members at typical discounts.)


```
                        ********************************
                        *                              *
                        *          PRINT MESSAGE       *
                        *                              *
                        * Test program to call "COUT"  *
                        * from language card.  Call by *
                        * loading "INDIRECT LC CALL"   *
                        * at $300 and issuing a        *
                        * "JSR $300"                   *
                        *                              *
                        ********************************

                                ORG   $D000
                        *
                        COUT    EQU   $FDED
D000:  A0 00                    LDY   #0
D002:  B9 16 D0         NXTCHR  LDA   MSG,Y
D005:  F0 0E                    BEQ   RET
D007:  48                       PHA
D008:  A9 FD                    LDA   #>COUT
D00A:  48                       PHA
D00B:  A9 ED                    LDA   #COUT
D00D:  48                       PHA
D00E:  20 0D 03                 JSR   $30D
D011:  C8                       INY
D012:  4C 02 D0                 JMP   NXTCHR
D015:  60               RET     RTS
D016:  D4 C8 C9
D019:  D3 A0 C9
D01C:  D3 A0 C1
D01F:  A0 D4 C5
D022:  D3 D4 AE         MSG     ASC   "THIS IS A TEST."
D025:  00                       BRK

--End assembly--      38 bytes        Errors: 0
```

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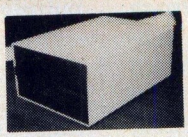

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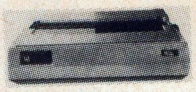

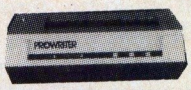

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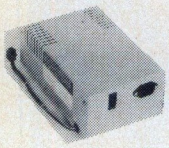

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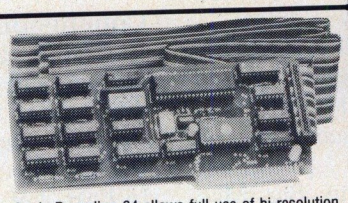

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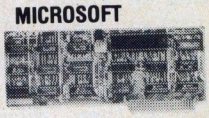

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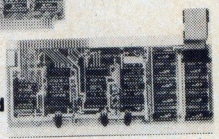

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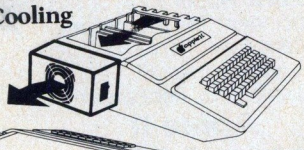

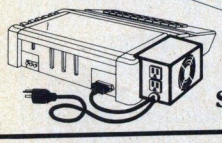

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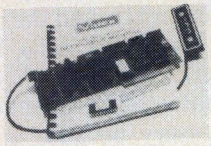

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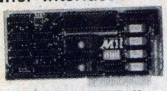

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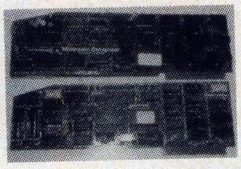

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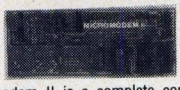

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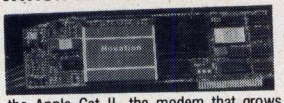

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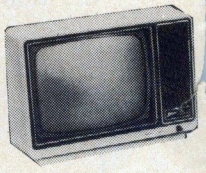

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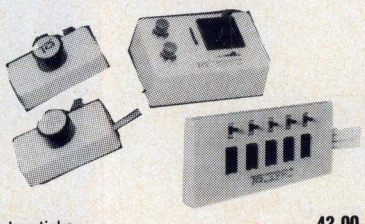

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A PROGRAM TO CONVERT APPLEWRITER FILES

Thomas G. Williams

THE program given in the February, 1982, issue of *Call –A.P.P.L.E.* to convert Applewriter files to ASCII files requires both the original and converted files to be resident in memory at the same time. It cannot, as mentioned in the article, convert long (more than about 16000 bytes) files in one pass. Also, the loading of first Applewriter, then the binary program, and then an Applesoft program seems somewhat cumbersome. Applewriter files are loaded starting at $1900 (6400 decimal). If you just need your Applewriter files converted to ASCII without any formatting, there is plenty of space for a BASIC program to convert and store a new file. This article first describes a simple BASIC program to do this and then some machine language enhancements to speed up the process.

As noted in the previous article, Applewriter uses its own internal code, not standard ASCII, to store text. This code is designed for the display of text on the standard Apple display. Comparison of Applewriter binary files with the ASCII Screen Character Set Table on page 15 of the Apple] [Reference Manual indicates that an Applewriter file is formatted according to the following rules.

1. Files begin with a single control byte and end with a pair of control bytes. The initial byte is $83. The first of the pair of end bytes is $60, the second appears arbitrary.
2. A carriage return is stored in normal Apple ASCII ($8D).
3. Upper case characters are stored for display in inverse video and occupy the range [$00,$1F]. The ASCII character can be recovered by adding $C0 to the stored character.
4. Upper case numerals, punctuation marks, and special characters are accepted by Applewriter and stored in inverse video in the range [$20,$3F]. The ASCII character can be recovered by adding $80 to the stored character.
5. Lower case characters are stored as upper case normal video characters and occupy the range [$C0,$DF]. The ASCII character can be recovered by adding $20 to the stored character.
6. Ordinary numerals, punctuation marks, and special characters are stored in normal video in the lower case range [$E0,$FF]. The ASCII character can be recovered by subtracting $40 from the stored character.
7. The ranges from [$40,$7F], flashing characters; [$80,$9F], control characters; and [$A0, $BF], numerals, etc. are not used, except for carriage return and the beginning and end characters.

Therefore, we can use the following rules to convert character codes, taking advantage of rule 7 to reduce the number of code ranges that must be checked. If C is the stored code and P is the desired ASCII code, then

```
IF   0<=C< 32 THEN P=C+192
IF  32<=C<123 THEN P=C+128
IF 128<=C<224 THEN P=C+ 32
IF 224<=C<256 THEN P=C- 64
```

Listing 1 shows the BASIC program to convert an Applewriter file. The actual conversion is handled in the single statement at line 220 of the program. It uses the arithmetic value of logical relations, which is neatly explained in another article in the same issue of *Call – A.P.P.L.E.*

The rest of the program is just the usual housekeeping needed to get the file in memory and write the converted file. Lines 120 and 130 request the name of the file to be converted and prefix it with "TEXT.", in case you forgot. Line 150 checks the initial byte to verify that an Applewriter file was loaded. Line 160 computes the length of the file from data stored by DOS when the file was BLOADed. Lines 200–240 form a loop which replaces each character in memory with its ASCII equivalent. The rest of the program allows the converted data in memory to be written as either a binary or a text file. A subroutine starting at line 500 allows the insertion of carriage returns at user-specified intervals for use in other word processors.

]LIST Listing 1

```
10  REM

    APPLEWRITER  FILE CONVERTER
     ** BASIC ONLY VERSION **

BY TOM WILLIAMS AND VAL J GOLDING

  CALL -A.P.P.L.E. :: DEC. 1982

100 D$ =  CHR$ (4):BUFRADR = 256 *
     ( PEEK (110) + 5): TEXT : HOME

110  INPUT "APPLEWRITER FILE NAME
     ";FILE$
120  IF FILE$ = "" THEN  PRINT D$
     "CATALOG": GOTO 110
130  IF  LEFT$ (FILE$,5) <  > "TE
     XT." THEN FILE$ = "TEXT." +
     FILE$
140  PRINT D$"BLOAD"FILE$;",A";BU
     FRADR
145 FILE$ =  RIGHT$ (FILE$, LEN (
     FILE$) - 5)
150  IF  PEEK (BUFRADR) <  > 131 THEN
      PRINT "FILE NOT IN APPLEWRI
     TER FORMAT": GOTO 300
160 EA =  PEEK (43616) +  PEEK (4
     3617) * 256: REM

200  GOSUB 800: FOR I = BUFRADR TO
     BUFRADR + (EA - 1)
210 X =  PEEK (I): IF X = 141 THEN
     240
220 X = X - 64 + 96 * (X < 224) +
     96 * (X < 128) + 64 * (X < 3
     2)
230  POKE I,X
```

CONVERTING APPLEWRITER FILES

```
240  NEXT : REM

300  HOME : PRINT "   ...CONVERSIO
     N COMPLETED": VTAB 4: PRINT
     "  [B]  SAVE AS BINARY FILE"
     : PRINT "  [T]  SAVE AS TEXT
      FILE"
310  PRINT "  [L]  LIMIT LINE LEN
     GTH": PRINT "  [Q]  QUIT": PRINT
     : HTAB 8: INVERSE : PRINT "
     SELECT ";: NORMAL : PRINT "
     ";
320  GET SAVFILE$: PRINT SAVFILE$
     : PRINT : IF SAVFILE$ = "B" THEN
      PRINT D$"BSAVE"FILE$",S,A"B
     UFRADR",L"EA: PRINT : PRINT
     "DONE": END
325  IF SAVFILE$ = "Q" THEN  END

330  IF SAVFILE$ = "L" THEN 500
340  IF SAVFILE$ = "T" THEN  PRINT
     D$"OPENT."FILE$: PRINT D$"WR
     ITET."FILE$
350  FOR I = BUFRADR TO BUFRADR +
     (EA - 1)
360  PRINT  CHR$ ( PEEK (I));
370  NEXT
380  PRINT : PRINT D$"CLOSE": PRINT
     : PRINT "DONE": END : REM

500  INPUT "LINE LENGTH ?";LL$:LL
      = VAL (LL$): IF  NOT  VAL
     (LL$) THEN LL = 239
510  GOSUB 800: FOR I = BUFRADR TO
     BUFRADR + (EA - 1)
520  COUNT = COUNT + 1
530  IF COUNT > LL - 10 AND  PEEK
     (I) = 160 THEN  POKE I,141:C
     OUNT = 0: GOTO 520
540  NEXT : GOTO 300
800  FLASH : PRINT : PRINT " WORK
     ING... ": NORMAL : RETURN
```

The output from this program differs from that of the original program since it lacks the formatting that would be done by the PRINT routine of Applewriter. There are two essential differences:

1. The original program will interpret all text-embedded printer commands, such as !np for new page. This program simply converts them.
2. The original program is writing output to an imaginary printer with 132 columns. It will supply carriage returns as necessary so that no string of characters without a carriage return will be longer than 132 bytes.

The importance of the second difference depends on what you plan to do with the converted data.

Long strings will not affect storage by DOS, since sequential text file records can be up to 32767 bytes long, and Applewriter files are only 32000 bytes maximum. If you just need raw data conversion for use with another machine or word processor, this program will work fine. If you are creating files to be EXEC'ed, you need to watch the string length in either case, because either insertion of arbitrary carriage returns or lines in excess of 239 characters will cause errors. If you plan to use BASIC programs to operate on the converted data, you may utilize the line length limit subroutine.

The only problem I have with this program is the lack of speed. For instance, it took about 4.8 minutes to convert this article, which is about 8150 bytes long, and another 1.5 minutes to write the converted data to a text file. This indicates that converting a full Applewriter file would require about 19 minutes, with another 6 minutes required if a text file is written. The culprit is Applesoft's inability to do integer arithmetic. In particular, in lines 200–240, the index I is maintained in floating point format and converted to integer for the PEEK statement. The value PEEKed is converted from a one byte integer to floating point, and all comparisons and computations in line 220 are done in floating point. Finally, the resulting floating point value is converted back to one byte for the POKE statement in 230. The same requirement for conversion affects the speed of the output loop at lines 350–370. Since the data is handled one byte at a time, these operations are natural candidates for use of machine language subroutines.

Listing 2 shows machine language subroutines which can be used to perform the conversion, output and line length limitation. The routine starting at XLATE does the character conversion, and the routine labeled OUT does the output for a text file after the file has been opened and prepared for writing. Label LIMIT handles the assembly equivalent of BASIC subroutine 500. Although a machine language subroutine could be used to simply perform the character conversion done by line 220 in the BASIC program, it is just as simple to perform the entire operation of scanning and converting the file that is done by statements 200–240. XLATE uses the same rules described above for conversion, although the order of the tests is altered somewhat. The routine tests for the end of text byte ($60) to terminate processing, rather than using the file length, because it is simpler. Notice that no arithmetic is actually needed for character conversion.

The text file writer OUT simply picks up each converted character and sends it to DOS via the standard COUT routine. It also uses the $60

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Listing 2

```
                 ********************************
                 *                              *
                 * Applewriter Char. Translator *
                 *                              *
                 *        by Tom Williams       *
                 *                              *
                 * Call -A.P.P.L.E. : Dec. 1982 *
                 *                              *
                 ********************************
                 *

                 *
                          ORG   $1000
                 *
                 *
                 BUFPTR    =     0
                 LNG       =     $2          ;Default line length
                 HBYTE     =     $11         ;Default HOB start of file buf
                 CR        =     $8D
                 SPACE     =     $A0
                 NDCHR     =     $E0         ;Default end of file chr
                 * ;$E0 is Applewriter I format after conversion
                 *

                 *
                 * Character translate routine
                 *

1000: A9 01      XLATE     LDA   #1          ;Set up initial address
1002: 85 00                STA   BUFPTR
1004: A9 11                LDA   #HBYTE      ;POKE TRAD +5, HBYTE
1006: 85 01                STA   BUFPTR+1
1008: A0 00                LDY   #0          ;Clear for indirect addressing
                 *
100A: B1 00      LOOP      LDA   (BUFPTR),Y  ;Get character
100C: 10 10                BPL   UC          ;Branch if upper case
100E: C9 8D                CMP   #CR         ;If [C/R], ignore
1010: F0 1C                BEQ   NEXT
1012: C9 DF                CMP   #$DF        ;Letter or otherwise?
1014: B0 04                BCS   LCNUM       ;Branch if otherwise
1016: 09 20                ORA   #$20        ;Lower case letter
1018: 90 12                BCC   STCHAR      ;Always
101A: 29 BF      LCNUM     AND   #$BF        ;Numeral,etc.
101C: B0 0E                BCS   STCHAR      ;Always
101E: C9 60      UC        CMP   #$60        ;Upper case, check for end
1020: F0 14                BEQ   DONE
1022: C9 1F                CMP   #$1F        ;Check for letter or otherwise
1024: B0 04                BCS   UCNUM       ;Branch if not letter
1026: 09 C0                ORA   #$C0        ;Convert letter
1028: 90 02                BCC   STCHAR      ;Always
102A: 09 80      UCNUM     ORA   #$80        ;Numeral, etc.
102C: 91 00      STCHAR    STA   (BUFPTR),Y
102E: E6 00      NEXT      INC   BUFPTR
1030: D0 D8                BNE   LOOP
1032: E6 01                INC   BUFPTR+1
1034: D0 D4                BNE   LOOP        ;Always
1036: 60         DONE      RTS
                 *
                 * Character output routine
                 *
1037: A9 01      OUT       LDA   #1          ;Set up initial address
1039: 85 00                STA   BUFPTR
103B: A9 11                LDA   #HBYTE      ;POKE OUT +5, HBYTE
103D: 85 01                STA   BUFPTR+1
103F: A0 00                LDY   #0
1041: B1 00      LOOP2     LDA   (BUFPTR),Y
1043: C9 60                CMP   #$60
1045: F0 EF                BEQ   DONE
1047: 20 ED FD             JSR   $FDED       ;Send character to DOS
104A: E6 00                INC   BUFPTR
104C: D0 F3                BNE   LOOP2
104E: E6 01                INC   BUFPTR+1
1050: D0 EF                BNE   LOOP2       ;Always

                 *
                 *
                 *
                 * Limit line length subroutine
                 *     by Val J Golding
                 *
```

CONVERTING APPLEWRITER FILES

```
                  81
1052: A9 11       82   LIMIT    LDA  #HBYTE       ;POKE LIMIT +1, HBYTE
1054: 85 01       83            STA  BUFPTR+1
1056: A9 00       84            LDA  #$0          ;Lo byte
1058: 85 00       85            STA  BUFPTR       ;Setup for Y index reg
105A: AA          86            TAX               ;Initialize counter
105B: A8          87            TAY               ;Buffer index always zero
                  88   *
105C: E6 00       89   LOOP1    INC  BUFPTR       ;Bump buffer up
105E: D0 02       90            BNE  SKIP         ;if not zero, go to work
1060: E6 01       91            INC  BUFPTR+1     ;Bump hi byte
                  92   *
1062: E8          93   SKIP     INX               ;Inc char counter
1063: B1 00       94            LDA  (BUFPTR),Y   ;Get a char
1065: C9 E0       95            CMP  #NDCHR       ;End of file?
1067: F0 10       96            BEQ  EXIT         ;Yes, finish up
1069: E4 02       97            CPX  LNG          ;Reached end of line?
106B: 90 EF       98            BLT  LOOP1        ;Nope, let's try another
106D: C9 A0       99            CMP  #SPACE       ;Is it a space?
106F: D0 EB       100           BNE  LOOP1        ;Nope, let's get another chr
1071: A2 00       101           LDX  #0           ;Reset char counter
1073: A9 8D       102           LDA  #CR
1075: 91 00       103           STA  (BUFPTR),Y   ;Replace with a c/r
1077: 30 E3       104           BMI  LOOP1        ;Always taken
                  105  *
1079: 60          106  EXIT     RTS               ;That's it. Back to BASIC
    --End assembly--      122 bytes        Errors: 0
```

byte to terminate the process. LIMIT simply processes the file a second time, prior to calling OUT and writing to disk. It uses the X Register as a counter, then compares it against the user supplied line length, inserts a carriage return when called for and resets the character counter.

Listing 3 shows the BASIC program which incorporates the machine language routines. This routine simply loads the routines into free memory as indicated by the high byte of STREND, $6E(110), plus a safety margin. The file buffer is established similarly. The increase in speed of the conversion routine is dramatic: a full Applewriter file conversion requires about 1.5 seconds (instead of 20 minutes). In practice, this means that the conversion is done about the time that the disk stops spinning after the BLOAD. Sequential text file writing is speeded up by about a factor of 3.5.

```
]LIST        Listing 3

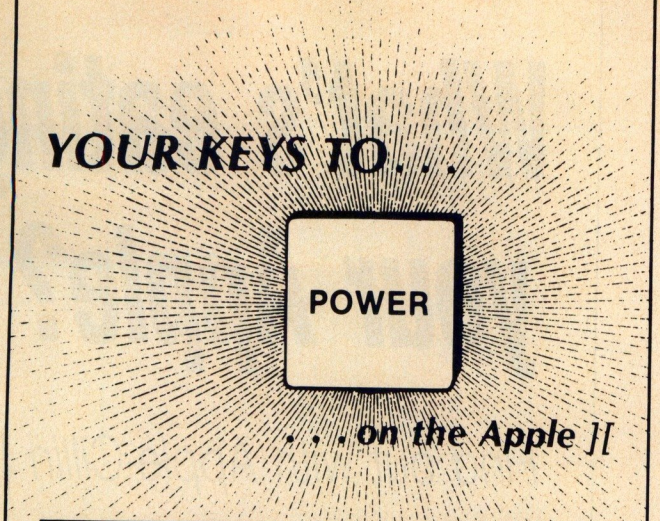
10  REM

   APPLEWRITER  FILE CONVERTER

BY TOM WILLIAMS AND VAL J GOLDING

  CALL -A.P.P.L.E. :: DEC. 1982

100 D$ =  CHR$ (4):BUFRADR = 256 *
     ( PEEK (110) + 5):BFILEADR =
     BUFRADR - 256:OUT = BFILEADR
      + 55::LIMIT = BFILEADR + 82
     :LNG = 2:NDCHR = LIMIT + 20:
      TEXT : HOME
105  PRINT D$"BLOAD TRANSLATOR,A"
     BFILEADR
107 HBYTE = BUFRADR / 256: POKE B
     FILEADR + 5,HBYTE: POKE OUT +
     5,HBYTE: POKE LIMIT + 1,HBYTE
110  INPUT "APPLEWRITER FILE NAME
      ";FILE$
120  IF FILE$ = "" THEN  PRINT D$
     "CATALOG": GOTO 110
130  IF  LEFT$ (FILE$,5) <  > "TE
     XT." THEN FILE$ = "TEXT." + FILE$
140  PRINT D$"BLOAD"FILE$;",A";BUFRADR
145 FILE$ =  RIGHT$ (FILE$, LEN (
     FILE$) - 5)
150  IF  PEEK (BUFRADR) <  > 131 THEN
      PRINT "FILE NOT IN APPLEWRI
     TER FORMAT": GOTO 300
160 EA =  PEEK (43616) +  PEEK (4
     3617) * 256: REM
200  CALL BFILEADR: REM XLATE
300  HOME : PRINT "  ...CONVERSIO
     N COMPLETED": VTAB 4: PRINT
     "  [B]  SAVE AS BINARY FILE"
     : PRINT "  [T]  SAVE AS TEXT
      FILE"
310  PRINT "  [L]  LIMIT LINE LEN
     GTH": PRINT "  [Q]  QUIT": PRINT
     : HTAB 8: INVERSE : PRINT "
     SELECT ";: NORMAL : PRINT "
     ";
320  GET SAVFILE$: PRINT SAVFILE$
     : PRINT : IF SAVFILE$ = "B" THEN
      PRINT D$"BSAVE"FILE$".S,A"B
     UFRADR",L"EA: PRINT : PRINT
     "DONE": END
330  IF SAVFILE$ = "L" THEN 500
340  IF SAVFILE$ = "T" THEN  PRINT
     D$"OPENT."FILE$: PRINT D$"WR
     ITET."FILE$
350  IF SAVFILE$ = "Q" THEN  END
360  CALL OUT
380  PRINT : PRINT D$"CLOSE": PRINT
     : PRINT "DONE": END : REM
500  INPUT "LINE LENGTH ?";LL$:LL
      =  VAL (LL$) - 10: IF  NOT
      VAL (LL$) THEN LL = 229
510  INPUT "ASCII VALUE FOR END O
     F FILE CHR          [DEFAULT
     = 224] ";EOF$:EOF =  VAL (EO
     F$): IF  NOT  VAL (EOF$) THEN
     EOF = 224
520  POKE NDCHR,EOF
540  POKE LNG,LL: CALL LIMIT: GOTO
```



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You review what you like from the pre-selected food groups in the system. Delete any foods you don't enjoy. Add anything new at any time. Then decide how often you like to eat certain items. For example. Don't like liver? Then eliminate it with a few simple keystrokes. Or, you can plan for it as seldom as once every 99 weeks or as often as daily.

Want to go out to your favorite restaurant? Enter the restaurant's name as a "Main Course." Now your computer will automatically remind you to go out to eat — and as often as you select. It will delete all other items from that meal except the name of the restaurant.

AUTOMATIC SHOPPING LIST

You get a new menu each week or for just a few days if you want. And, it generates a detailed shopping list, automatically. It can arrange each item on the list in sequence according to the aisles at your favorite store. Studies show a shopping list will discourage impulse buying and save you money.

Also, it generates a per serving calorie counter. This is easy to delete anytime you are not in a diet mood or want to celebrate for any reason. You never count calories unless you want to.

RANDOMLY DELICIOUS

Say goodby to boring meals. Your computer will remember variety is the spice of life. This system makes eating at home a pleasure again. Each menu is randomly generated from major food groups according to the specific criteria you select. The system is easy to learn and easy to operate. Yet it is a sophisticated piece of software which will prevent menu mix-ups.

It will add a new dimension to your home meals without increasing your food costs. It is rumored The Pizza Program may actually reduce the climbing divorce rate. Husbands now have something to look forward to for dinner. Wives think it is terrific because it saves time and effort. And, kids love anything computerized. This is a useful and practical application you'll appreciate day after day, week after week.

TRY IT FOR 30 DAYS WITHOUT RISK

This tested system is guaranteed to make your life easier and happier. Our home trial lets you actually use The Pizza Program for a full 30 days before you decide to keep it. Watch the fun and convenience it creates. Enjoy better meals and see how much time it saves. If you are not satisfied for any reason, return it within 1 month for a prompt and courteous refund. Your investment is just $34.50 plus $2.00 for shipping and handling. (California residents add 6½% sales tax.) Full documentation is included.

OUT OF THE RUT

One housewife's reaction to this program is typical. She wrote, "Before using your system I found myself getting into a rut of serving the same things over and over. The Pizza Program has changed all of this for me. We now have a wider variety of dinners and best of all I don't have to decide what they will be. If this was all it did, I'd be thrilled. But it isn't. The shopping list I receive along with my menus has been such a time saver. I quickly run through it and delete anything I feel I don't need and add something I might. I would have a hard time going back to doing my menus by hand."

This system requires an Apple II Plus* with 48K and 1 disk drive. We urge you to take advantage of our no-risk, 30 day home trial offer. To order call toll free and use your VISA or MasterCard. Or, send a check to the address below. There's no obligation. Order today.

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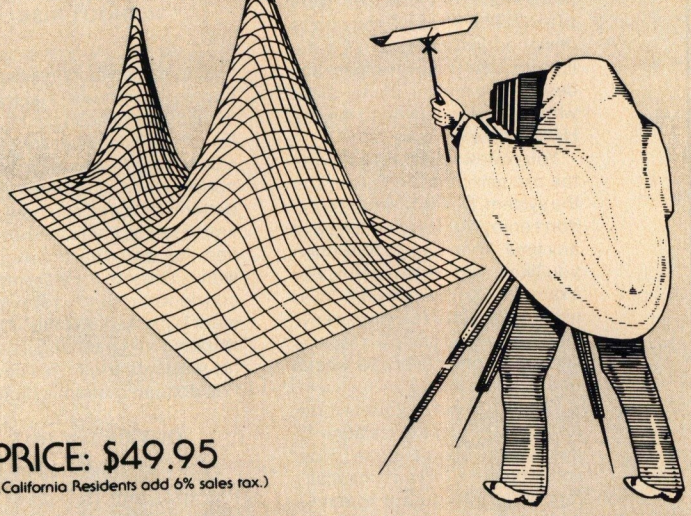

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Just a FEW of the possible printers include: EPSON, PAPER TIGER, ANADEX, NEC, DIABLO, QUME, MPI, SILENTYPE, OKIDATA, MALIBU; interface cards include: APPLE, SSM, CCS, MTN COMP. CPS, MPI, GRAPPLER, TYMAC, PROMETHEUS and more!

In addition to versatile print options (easy cropping, variable magnifications, normal/reverse inking, vertical/horizontal format, etc.) **PRINTOGRAPHER** offers such unique features as the ability to print pictures directly from disk (without loading a file), spooling via our **DOUBLETIME PRINTER** package, or sending pictures over a phone line using **ASCII EXPRESS**. You can even put graphics in your text documents with our text editor software, **THE CORRESPONDENT**. As if that wasn't enough, we've made it easy to put the **PRINTOGRAPHER** routines right in your own programs to do Hi-Res printing immediately during their operation, without having to save screen images to disk!

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VIDEO FOLLOW UP

Jim Hockenhull

RESPONSE to "Video Interfacing" in the June, '82 issue has been overwhelming. As a result of calls and letters three more related products have come to light. All claim to convert the Apple]['s weird video signal into full National Television System Committee (NTSC) standard, broadcast-quality output. They are:

The FULL NTSC CONVERTER,
BDL Elec
P.O.Box 43
Beloiel, Quebec
CANADA J3G 4S8
Price: ca. $800.

This unit consists of a printed circuit board which fits in Peripheral Slot #7 and a few dual-inline-package (DIP) headers, inserted between integrated circuits (ICs) and the Apple motherboard. A bit of soldering is also required for installation. The Converter requires an external composite video source for "gen-lock," a system of regenerating synchronizing pulses and color subcarrier so that the new Apple signal is "in step" with everything else. In a broadcast system it can be treated like a camera and used in fades, wipes, and keys.

Reports from users of the Converter have ranged from highly enthusiastic to very negative. A drawback mentioned by everyone is that colors tend to noticeably jitter and crawl. In the U.S., the Converter is distributed by

Broadcast Engineering
4973 Via Cinta
San Diego, CA 92122
(714) 543-6206

and

Photo & Sound Co.
19221 66th Ave South
Seattle, WA 98188

The VB-1 Computer Board,
Video Associates Labs, Inc.
2304 Hancock Drive, Suite 1-F
Austin, TX 78756
(512) 459-5684
Price: ca.$1850

The VB-1 consists of two boards, one of which fits into any of the Apple's peripheral slots, the other being mounted on top of the power supply. Other connections to the motherboard are made through DIP headers. No soldering or trace cutting is required. It also needs an external composite video source for synchronization; Apple graphics are "keyed" (superimposed) over this source. No computer memory is taken up by the board's operation; it is compatible with all Apple software.

On the market for some time, over 200 VB-1 units are now in use. Typical applications include the generation of color titles, of weather maps, logos, animations and other TV graphics.

The VB-3 MICRO-KEYER,
also from Video Associates Labs.
Price: ca. $2400

A newer and more versatile board than the VB-1, about 70 have been sold. The VB-3 will not only gen-lock to external video sources but can also stand alone with no video input. It incorporates its own full screen color matte generator, an analog device which will fill the entire screen with any of 2,560,000 colors (!) and key the Apple graphics over it. Saturation, hue, luminance, horizontal phase, and color-burst phase (and a few other things) are controllable through about 2.5K of driving software. Source listings of the software are provided.

In normal operation the VB-3 displays the usual undersized Apple screen (the rest, remember, can be filled in with a couple of million background colors). Interestingly, software is now under development to allow the Apple to generate a full screen (360x240) of graphics, combing Hi-Res pages 1 and 2.

Testimonials for both the Video Associates Labs units have been glowing, to say the least, one user describing the VB-3 as "as good as it can get." Mr. Saul Bernstein of Thousand Oaks, California recently won an Emmy for TV graphics done with an Apple/VB-3 combination.

I emphasize that I have not seen any of these products in operation; I'm merely passing along information gathered from manufacturers, distributors, and users. Apparently advertising has been done in the broadcasting journals and hence has escaped the notice of most us computerists.

And finally, a couple of follow-ups of the June article:

a) I have as yet been unable to re-combine the Amdek DVM red-green-blue- signal into composite video. As a color display device, though, the DVM/Color II combination is absolutely wonderful.

b) Manufacturers' addresses were omitted from the article. They are:

Adwar Video Corp.
100 Fifth Ave.
New York, NY 10011
(2122) 691-0976

Amdek Corporation
2420 E. Oakton St.
Arlington Heights, IL 60005
(312) 364-1180

Symtec, Inc.
15933 West 8 Mile
Detroit, MI 48235
(313) 272-2950

My deepest thanks to all those who have called or written about this whole video problem.

```
]LIST

5  HOME
10  FOR X = 1024 TO
      2039 STEP  INT
      ( RND (1) * 10)
      + 3: IF  RND (1)
      ) .5 THEN  POKE
      X,32: NEXT : GOTO
      10
20  POKE X,160: NEXT
      : GOTO 10
30  REM

SO WHAT DID YOU EXPECT?

DAVE BROWN : CALL -A.P.P.L.E
```

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☐ My company may be interested in exhibiting, send me information.

APPLEMASH

Michael Thyng

USUALLY we get involved in something heavy, but this time let's just have some fun. Something has plagued me for years; take a minute and contemplate this, I'm sure you can handle it.

This should probably be listed in the "I wouldn't have expected that department." Enter this program:

```
10  A = 1
20  PRINT A
30  A = A + .01
90  GOTO 20
```

Type RUN. Do you notice anything unusual, anything you didn't expect? That is the only worm in my Apple that I couldn't live with. A call to the Hot Line gave me the idea for a solution. Here is the algorithm for two decimal places.

```
40  A$ = STR$ (A)
50  FOR J = 1 TO LEN (A$)
60  IF MID$ (A$,J,1) = "."
    THEN 70
65  NEXT J
70  IF LEN (A$)    J + 2 THEN
    A$ = LEFT$ (A$,J + 2)
80  A = VAL (A$)
90  GOTO 20
```

That's probably worth the price of your membership right there.

```
]LIST

1   REM

SO WHAT DID YOU EXPECT

DAVID LOWE : CALL -A.P.P.L.E


10   HGR : HOME : DIM
       C(6)
20   DATA  96,17,10,4,10,17
30   FOR I = 0 TO 5:
       READ C(I): NEXT
       I
40   FOR J = 0 TO 26:
       FOR I = 0 TO 5
50 Y = J * 6 + I: POKE
       228,C(I)
60   HPLOT 0,Y TO 279,Y
70   NEXT I: NEXT J
80   VTAB 22: PRINT "SO
       WHAT DID YOU EXPECT?"
90   END
```


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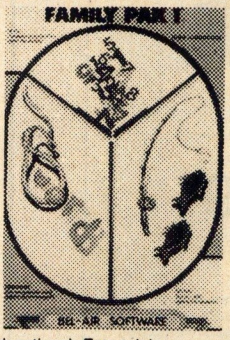

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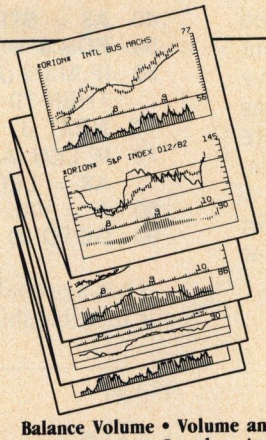

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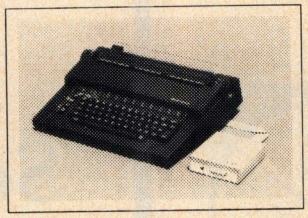

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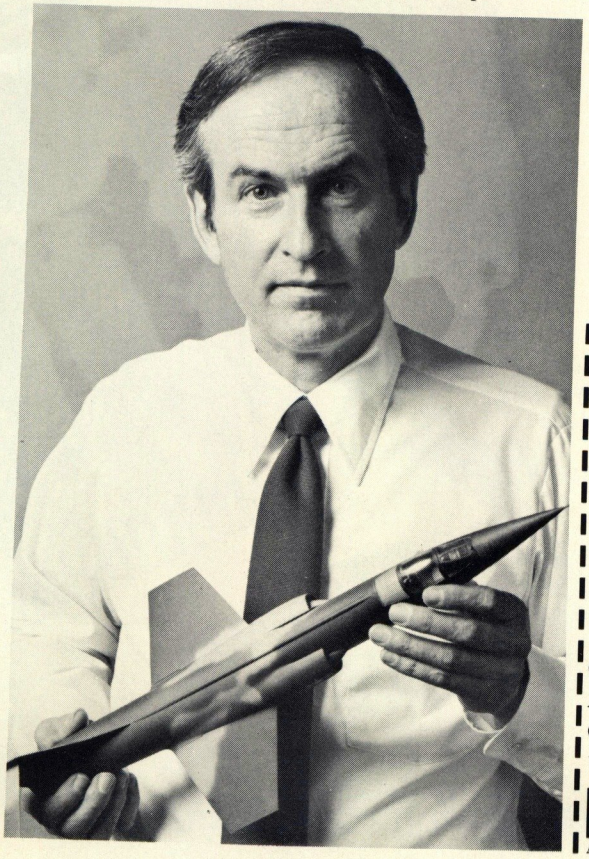

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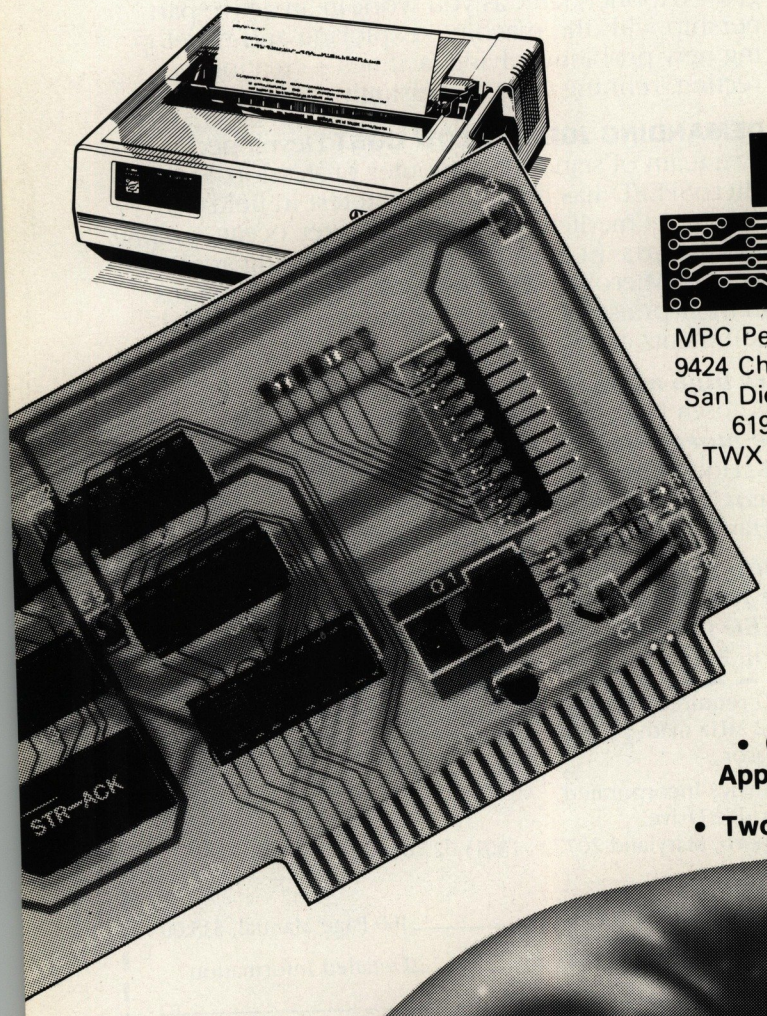

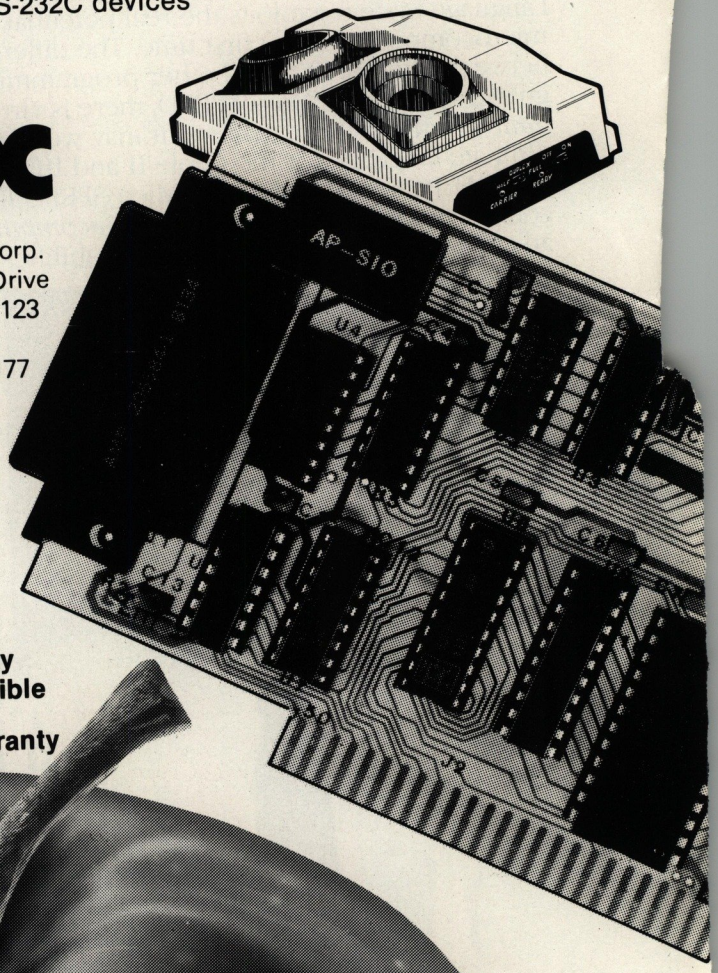

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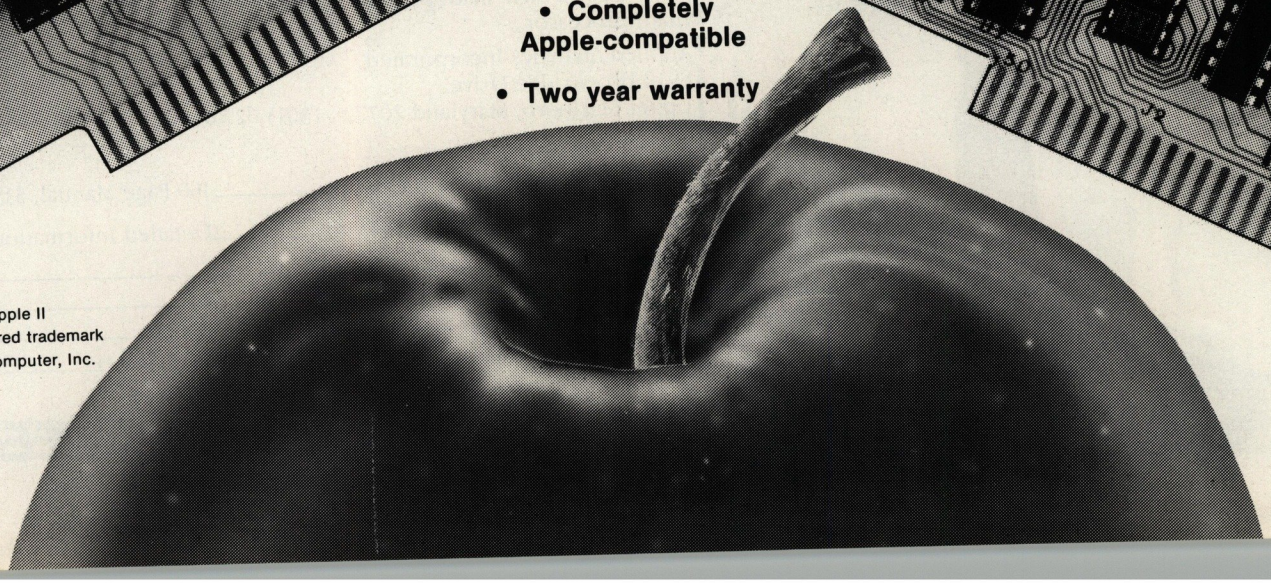

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NEXT!

Wes Huntress

UNLIKE Integer Basic, in Applesoft it is not necessary to include an argument for the NEXT statement at the end of a FOR...NEXT loop. NEXT works just as well as NEXT I, and is even a bit faster. What the manual doesn't say, however, is that you can get in trouble when not using the argument if you are in the habit of prematurely terminating FOR... NEXT loops. Conditional termination of FOR...NEXT loops is a useful programming technique, and in Applesoft it is necessary to include the argument for the terminal NEXT statement in such loops. The accompanying demo illustrates what happens in conditionally terminated FOR... NEXT loops when the argument is omitted.

In formatting the demo program for *Call -A.P.P.L.E.*, several features of the REM statement were noticed. Applesoft formats REM statements according to four simple rules:

1. There is always two spaces between the line number and REM.
2. There is always one more space than you originally typed between REM and the first letter of your remarks.
3. The right margin is at column 32.
4. After the first line, the left margin is at column 5.

Given these rules, it is easy to format your Applesoft REM statements. First POKE 33,33 to set the right margin at column 32. Type the line number, followed by three spaces, REM, and one space less than you wish to have between REM and the first letter of your remarks. Now type your remarks to the end of the first line (column 32). If a word overruns the right margin, back up and space over it or hyphenate it appropriately. Use spaces as necessary at the right margin until the cursor moves to the next line at the far left margin (column 0). Use ESC A to edit over to column 5 and begin typing again. Repeat these procedures for each new line in order to right and left justify your remarks between columns 5 and 32.

```
]LIST

10   REM

     APPLESOFT  "NEXT" DEMO
        BY  WES HUNTRESS

CALL -A.P.P.L.E. : DEC. 1982
25   HOME : PRINT : PRINT "ST
     ART": PRINT
30   FOR I = 1 TO 5
35   :: FOR J = 1 TO 10
40   PRINT : PRINT "LINE 50"
45   :: NEXT
50   PRINT : PRINT "LINE 50"
55   NEXT
90   PRINT : PRINT "EXIT"
95   END : REM
99   REM

HOW MANY PRINTED LINES
DO YOU EXPECT?
TRY CHANGING LINE 45 TO
:: NEXT J, AND LINE 55
TO NEXT I. NOTICE
A DIFFERENCE?
```

```
]LIST

10   REM

SO WHAT DID YOU EXPECT?

TIM JACKSON : CALL -A.P.P.L.
      E.
15   TEXT : HOME : FLASH
       : PRINT "WARNING"
20   NORMAL : PRINT "REMOVE
       DISKETTES FROM
       YOUR DRIVES BEFOREYOU
       CONTINUE. THEN
       PRESS ANY KEY."
30   POKE  - 16368,0:
       WAIT  - 16384,128:
       POKE  - 16368,0
40   HGR2 : ROT= 0
50   FOR K =  PEEK (78)
       TO 0 STEP  - 3
60   POKE 232,K
70   FOR J = 208 TO 255
80   POKE 233,J:N =
       PEEK (K + J *
       256)
90   FOR S = 0 TO N:
       SCALE= S + (S
       = 0)
100  FOR H = 1 TO 6
110  HCOLOR= H: DRAW
       S AT 139 + H,96
120  NEXT H,S,J,K
```


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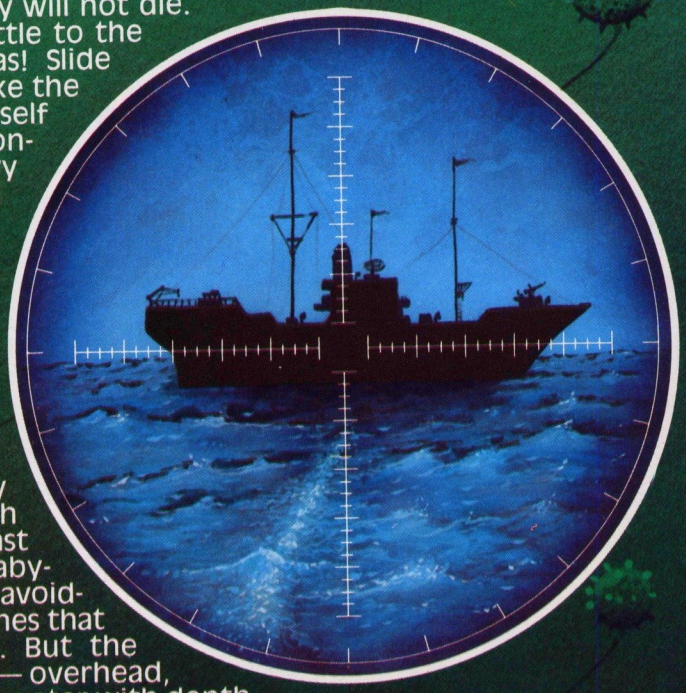

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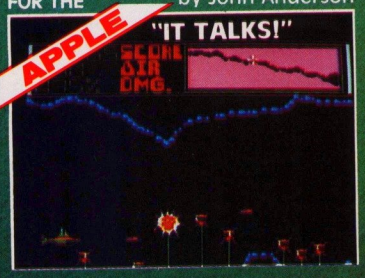
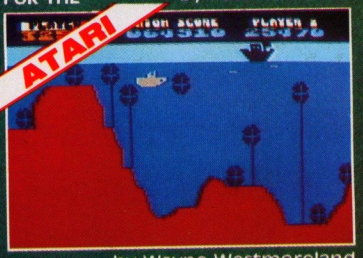


FOR THE ATARI by Russ Wetmore



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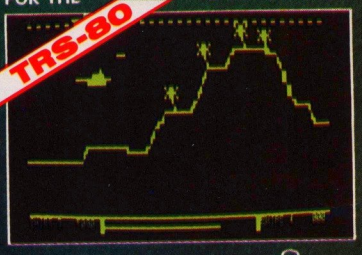

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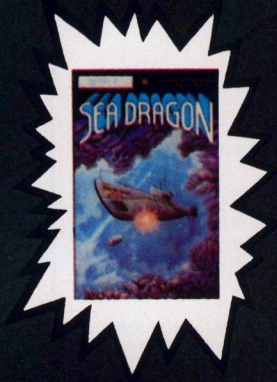

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EXPLORING THE WORLD OF APPLE:

DISK MAPPING THE Z-80 CP/M SYSTEM

Art Messler

THE Z-80 Softcard (by Microsoft) must be one of the finest enhancements available today for the Apple][computer. It increases the utility and potential for the machine, and frankly, is a pleasure to use. For the software experimenter, it is like having one (or maybe two) new machine(s), all for the cost of a few trips to the grocery store.

The Z-80 CP/M system does not see the world in the same way as does the 6502-based computer. Accordingly, the Apple's memory and disk maps are reorganized to reflect the new view of things. The Apple Z-80 memory map has been thoroughly described in a recent article by Wes Huntress. In the present article, I will try to elucidate the Apple CP/M disk map. CP/M (The Softcard's operating system) comes in 13-sector and 16-sector versions, but I will only discuss the 16-sector version-and I am assuming that you already know a little about DOS and CP/M.

Most disk and memory references are in hexadecimal, with "$" or "H" added for clarity. Please remember that 6502 addresses are different from Z-80 addresses. The Z-80 would see the 6502 address, $0300, as 0F300H.

A disk must be formatted before it can be used. The CP/M formatter creates the usual 35 tracks of 16 sectors, but sets every data-byte on the disk to $E5. The $E5 value serves a useful purpose only in the directory portion of the disk to indicate an erased file.

The newly formatted disk is quite ordinary, and can be dumped with any of the usual 6502 based disk utility programs. It can also be dumped from within CP/M, but that involves notions beyond the focus of this article.

No file, directory, or system code is placed on the disk by the FORMAT command. Many eight inch disks come factory formatted with $E5. Consequently, they are ready for immediate use on CP/M systems.

The formatted disk will accept data, but will not boot until it has an operating system. CP/M is put onto the disk with the COPY command, and ends up on tracks $0, $1, and $2—just where you would expect.

The operating system is written mostly for the Z-80/8080, but there is a good amount of 6502 code on track $0. This is reasonable, since the Z-80 needs considerable support from the 6502.

A 6502 I/O package is found on track $0, beginning at sector $9. It includes a modified (different from DOS 3.3) RWTS, with its associated read, write, nybble, format, set-up, and miscellaneous routines. The RWTS boots to memory location 0FE00H, with the other routines loading just below it. You might enjoy trying to decipher the I/O control block (IOB), which begins at 0F3E0H.

CP/M considers files to be comprised of 128-byte RECORDs. A large file may consist of several EXTENTs of 128 records each. Such an organization conflicts with the way in which data must be stored on the disk (256-byte sectors), but the BIOS portion of CP/M automatically combines records (to fill up sectors) if necessary.

Disk file space is allocated in 1024-byte "blocks." Therefore, any file created under CP/M, even a file of only a few bytes, occupies at least four sectors. This allocation scheme may appear a bit inefficient at first, but it tends to keep files on as few tracks as possible, and so reduces access time—CP/M's disk access is very fast.

Is your abacus handy? There are four blocks per track, and each block is numbered. Blocks $0, $1, $2, and $3 are on track $3, and the numbering continues on track $4, up to the last track on the disk.

There are 128 blocks available to the system. You can find the track-location of any block by starting at track $3, and counting, four blocks per track, until you get to the block-number you want. Or, if you prefer, track-number = int (block-number / 4) + 3.

Now for the best part! The sectors within each block are not contiguous, but are scattered about the track to increase speed. The ordering of sectors within a block follows one of four patterns:

Pattern-number	Pattern
$0	$0, $6, $C, $3
$1	$9, $F, $E, $5
$2	$B, $2, $8, $7
$3	$D, $4, $A, $1

The pattern-number for a block is its block-number modulo 4.Pick a block, say block $9. Well, 9 modulo 4 = 1, so block $9 (on track $5) follows pattern $1. Suppose that the system is to store five records in block $9. CP/M allocates all four sectors of the block, and stores two records in sector $9, two more records in $F, and a final record in sector $E. Sector $5 is allocated, but unused. Blocks $0 and $1 are reserved for the directory.

Let's consider one more example before moving ahead. Suppose that you send eleven pages of the Apple's memory to a freshly formatted disk. CP/M allocates the first three available blocks: $2, $3 and $4. The file is threaded onto tracks $3 and $4 in the following order: track $3, sectors $B, $2, $8, $7, $D, $4, $A, $1; track $4, sectors $0, $6, $C. The file consists of 22 records, and occupies 11 sectors in three blocks. Sector $3 on track $4 is allocated, but unused.

Once Apple-C/M disk allocation and blocking are understood, the organization of the directory is easily grasped. It can hold up to 64 entries, however, for some reason Microsoft limited the number to 48. Each entry is 32 bytes long, and may be partitioned into seven fields,

```
u ffffffff ttt e ss r
aaaaaaaaaaaaaaaa,
```

where

u is the user-number
f is the primary filename
t is the type or secondary filename
e is the extent-number
s is for system use in the file control block
r is the number of records,and
a is the allocation for the file

```
]LIST
10   REM SO WHAT DID
       YOU EXPECT
JAY  BAKST :CALL -A.P.P.L.E.

20   DIM A(9,2)
30   HOME : PRINT "SO
       WHAT DO YOU EXPECT?";
40   FOR PAUSE = 1 TO
       500: NEXT
50   FOR X =  - 8 TO
       8 STEP 2
60  X1 = X / 2 + 5
70  Y =  INT ( SQR (100
       - X * X) + 1.5)
80  A(X1,1) = Y:A(X1,2)
       = 13 - Y
90   NEXT X
100  SO$ =  CHR$ (( PEEK
       (36) - 2) * 4 + 3)
110  WHT$ =  CHR$ ((
       PEEK (36) - 3)
       * 4 + 3)
120   HOME : SPEED= 50
130   FOR I = 1 TO 9
140   VTAB (I + 1): HTAB
       (A(I,2)): PRINT SO$
150   VTAB (I + 9): HTAB
       (A(I,1)): PRINT SO$
160   IF I < 5 THEN
       VTAB (I + 1):
       HTAB (A(I,1)):
       PRINT SO$
170   IF I > 5 THEN
       VTAB (I + 9):
       HTAB (A(I,2)):
       PRINT SO$
180  Z = 2 -  INT ((ABS
       (5 - I) + 1) / 2)
190   VTAB (10 - I) *
       2: HTAB (A(10
       - I,2)) + 20 -
       Z: PRINT WHT$;
200   VTAB (I) * 2: HTAB
       (A(I,1)) + 21
       + Z: PRINT WHT$;
210   NEXT I
220   SPEED= 255
230  I =  PEEK (37) +
       2:J =  PEEK (36)
       - 22: POKE 37,I:
       PRINT : POKE 36,J
240   PRINT "WHAT DID
       YOU EXPECT?"
```


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DISK MAPPING THE Z-80

An example or two may be helpful. I have separated the following directory dumps into fields, although they would not appear that way on the disk.

The user-prefix indicates that this file belongs to user $0. The filename is entirely in low-ASCII, which is the usual state of affairs, however either the system or the user may set certain bytes high to give the file new attributes. Do this carefully; your file could easily obtain unwanted or meaningless attributes. The type-qualifier for this file is also in low-ASCII. This entry controls extent $0 of the file, and since the file is small, there are no other extents. The two bytes of the s-field are perplexing. I have not found them to be active in the directory, and suspect that their main use is in the control block which the system sets up in memory for each open file. The present file consists of two records (one sector) and is stored in block $2. Below is another directory entry, $2.

A close look at the entry shows that the file belongs to user $3. Its 10 records are stored in blocks $3 and $4. Notice that the second byte of the t-field is in high-ASCII, an indications that the file has the SYS (system) attribute.

When a file is erased, its user-number is set to $E5. You can restore the file (if its allocation is intact) by setting its user-number to something more reasonable, such as $0.

A very large file may require multiple directory entries as shown in entry #3.

The file is 33K in length! It must be partitioned into three extents; the e-fields confirm that the entries control extents $0, $1, and $2. The first byte of each t-field is high, giving the file the R/O (read/only) attribute. Extent $0 contains 128 records, and is written into blocks $5 through $14. Extent $1, also with 128 records, is found in blocks $15 through $24. But extent $2 has only four records, which fit nicely into block $25.

There it is. Initially, it looks complicated, but upon further reflection, it becomes elegant and simple. You have probably noticed that the organization of the directory seems to obviate the need for separate track-bit maps and track-sector lists.

As you have also probably discerned, I am very enthusiastic about Apple CP/M. Much of the information for this article was gathered the hard way—by dumping and analyzing CP/M disks, sector by sector. If you find any mistakes, please let me know. If you should uncover something new about Apple CP/M, please let us know that too.

The *CP/M Alteration Guide* (not supplied with the Softcard) would be useful for those wanting to know more about the BIOS module of CP/M, which determines how CP/M interfaces to specific hardware (e.g., Apple 16 or 13 sector disks). This manual may be ordered from Digital Research.

Entry 1

```
00  40494E4946494C45  484558  00  0000  02  0200000000000000...00
    ↑↑                ↑       ↑   ↑     ↑   ↑
    u f               t       e   s     r   a
```

Entry 2

```
03  4049444946494C45  48c558  00  0000  0A  0304000000000000...00
    ↑↑                ↑       ↑   ↑     ↑   ↑
    u f               t       e   s     r   a
```

Entry 3

```
00  4D45474146494C45  C84558  00  0000  80  05060708090A0B0C...14
00  4D45474146494C45  C84558  01  0000  80  15161718191A1B1C...24
00  4D45474146494C45  C84558  02  0000  04  2500000000000000...00
    ↑↑                ↑       ↑   ↑     ↑   ↑
    u f               t       e   s     r   a
```

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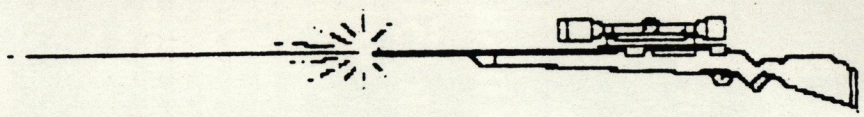

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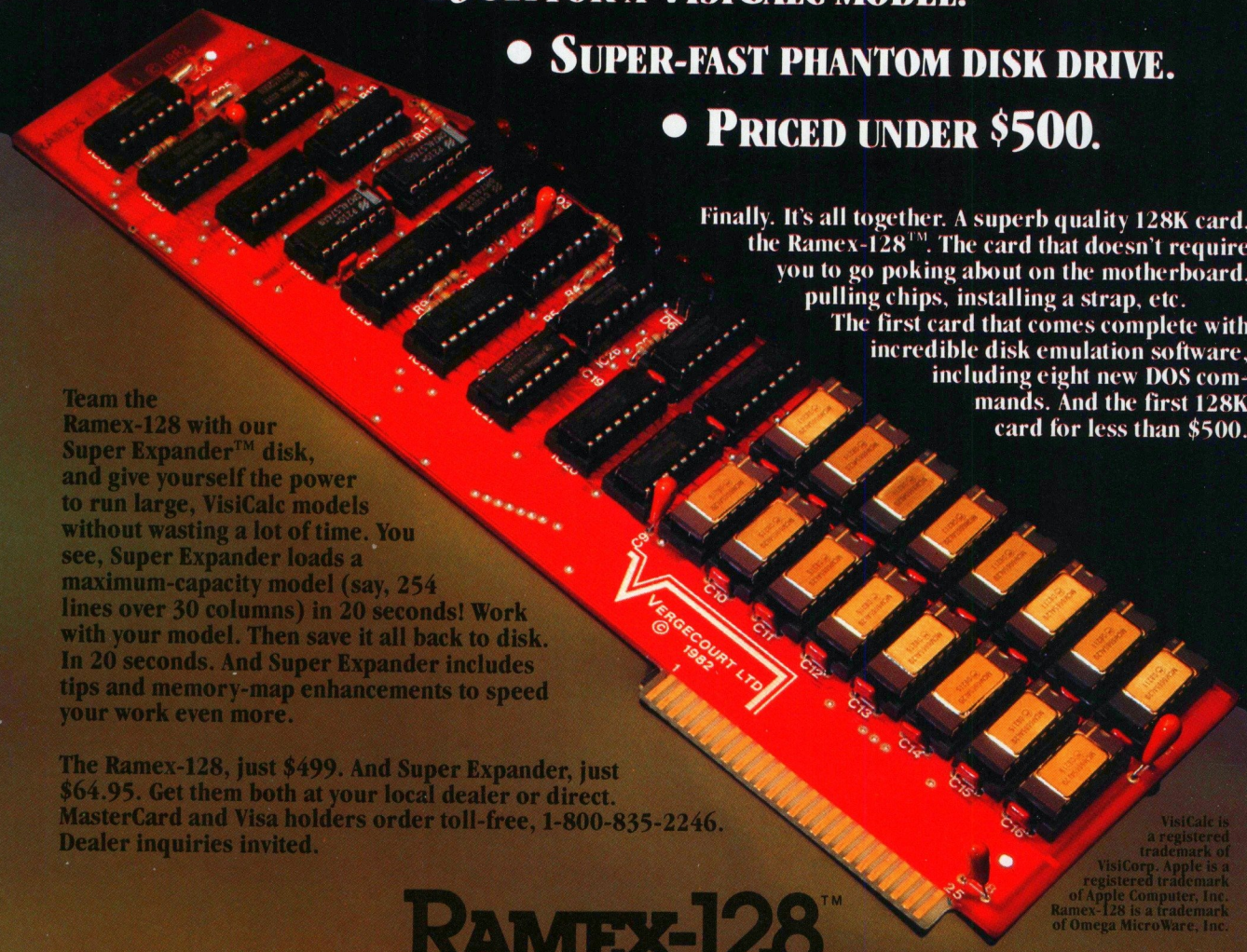

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PROGRAMMING AND PROBLEM SOLVING

Dr. David A. Lingwood

THIS article began as a letter to the *A.P.P.L.E. Doctor*, in answer to a question in the June *Call -A.P.P.L.E.* about precision — or the lack of it — in mathematical and statistical calculations (June, p. 77). As the letter "wrote itself," it became obvious that there is a broader lesson about finding and using *information resources*, or perhaps better yet, about *problem solving methods*, that is more important than the solution of the particular problem.

So, this article is divided into two parts. I will talk about the specific numerical accuracy problem first, then go on to the more general resources problem, using accuracy as a specific example.

The Accuracy of Statistical Calculations

The *A.P.P.L.E. Doctor* is generally correct that "answers were only as accurate as my least accurate measurement." However, single precision *may* be sufficient in statistical summations, *or* may cause severe rounding error problems depending on the magnitude of the original data.

Most of the problems the reader mentions occur through blind use of what are known as "machine calculation formulae" for things like means and sums of squares. "Machine" here refers to calculators, not computers. These formulae were developed in the early days when all researchers had available were large electric calculators.

As an example, let's look at the "definitional" and "machine" formulae for statistical variance. Any statistics book will give these as:

(definitional)

$\Sigma x^2/N$

where x is the deviation of a single data value from the mean of all values

This implies you need to know the mean in advance — i.e., that you enter all data values first to find the mean, then enter all the deviations in a second pass — computationally inefficient. Hence the "machine" formula:

(machine) $N \Sigma X^2 - (\Sigma X)^2$

The sigma (Σ) means "sum of." This lets you make one pass through the data. To compute a mean and a variance, the researcher would enter data one value at a time, and the calculator would store three sums: 1) the number of entries (i.e., "N"); 2) the sum of the data values (sum X); 3) the sum of squared data values (sum X-squared). These values are then plugged into the formula.

If data values are small relative to the storage accuracy of the machine, everything is fine, and the results are accurate. However, if the data values are large to begin with, and/or there are many such values, there can be substantial rounding error in storing the sum of the *squared* data values. Goodnight (1979, p. 151) says, "Any program written in single precision is obviously in trouble when more than four significant digits appear in the input data." Kennedy and Gentile (1980, p. 320) note, "for a given floating-point level of precision, there will always be data sets that are sufficiently ill-conditioned so that they cannot be processed accurately."

The definitional formulae are more accurate since there is a subtraction of the mean from the data values before taking the sum. So, the values summed are smaller.

The problem is even worse in calculating correlations between *two* measures or variables. Here one needs to store the sum of the squared *products* of pairs of data values.

What to do? Either use multiple precision, or change formulae. Applesoft, FORTRAN, etc. lack double precision, so one obviously needs different formulae.

The simplest approach is to go back to the definitional formulae, making two passes through the data. Calculate the sum of cases (N) and the mean in the first pass, then the sum of deviations from the mean. If you don't have so many observations that calculation time becomes a factor, this is fine. In fact, I would always recommend this approach for the student who wants to learn how various statistics work by writing programs for them. However, in a "production" statistics package, time becomes very important.

There is a solution, however, generically known as "provisional means" algorithms. The strategy here is conceptually simple. The formula you use calculates, at each observation, the difference between the present data value and the results of the definitional formula based on all the previous observations, then adds this difference in to the total. In the case of means and variances, at the end of one loop through the data, the two storage variables used will contain the mean and the sum of squared deviations from the mean ("little x squared") directly.

Kennedy and Gentile (p. 323) give formulae for means and the cross products needed in a correlation. An Applesoft loop for means and variances looks like this:

```
N = 0: MN = 0: SX = 0: REM # CASES, MEAN, AND SUM OF SQ. DEVIATIONS
FOR I = 1 TO NC: REM STEP THROUGH NC OBSERVATIONS OR "CASES"
    N = N + D(I) : REM D( ) IS VECTOR OF DATA VALUES
    X = D(I) - MN : REM DIFFERENCE BETWEEN DATA AND PREVIOUS MEAN
    MN = MN + X / N : REM UPDATE PREVIOUS MEAN VALUE
    SX = SX + X * (V - MN) : REM UPDATE PREVIOUS SUM SQ. DEVIATIONS
    NEXT I
PRINT "N = ";N;" MEAN = "MN
PRINT "VARIANCE = ";SX/(N-1)
```

How accurate is it? A user of my AIDA statistical analysis package on the Apple] [has recently done comparisons of the AIDA correlation routine against two mainframe statistical packages (OSIRIS and MIDAS), which use *double* precision machine formulae on an Amdahl 470. AIDA's provisional means results give *greater* accuracy!

Information and Problem Solving

Information Problems

The reader is not alone in struggling with accuracy problems, and this is the most important thing for him/her to realize. Computer science *is* a science. This means two things:

1. Knowledge is *cumulative*: there is a large literature of research and algorithms dealing with any problem a microcomputer programmer is ever likely to encounter. This literature builds on — and references — earlier knowledge.
2. Knowledge is *tested*: solutions to problems are verified and compared. Dimensions of comparison usually involve either the accuracy and/or efficiency (i.e. speed) of computation.

Only a part of the "science" has rubbed off on the microcomputer literature. Authors and editors need to be taken to task for:

- not testing the programs they publish
- not insisting that authors reference previous articles
- not comparing one program with similar ones.

Moreover, published reviews will only rarely test against standard benchmarks, and even then, the accuracy of computation is infrequently tested with rigor. Why? Because testing for accuracy requires running a program with a full range of possible data, looking for obscure bugs or errors that may pop up only in certain rare circumstances. In short, it is darned hard work.

Indeed, about all the comparison that ever gets done is on *speed*. Few articles ever test for *accuracy*, though in many cases accuracy is (we hope!) self-evident. Some of the scientific tradition is evident in development of "benchmarks" through which computers and languages are compared, but even here, too many authors develop their own benchmark programs, rather than researching what benchmarks already exist in the literature. If the author uses his/her own benchmarks, then the knowledge gained is very limited by being non-cumulative.

Why do we have these problems? Simply, many authors and editors are not scientifically trained. In fact, microcomputer "science" may be the first instance of a field in which scientific or technical knowledge emerged from a field not dominated by scientists themselves. Put another way, microcomputing is the only field I know of (and my own research field is technology transfer) in which knowledge producers and users mingle equally.

Microcomputing is thus very "action oriented." Users-cum-authors often sit down and whip out programs to solve immediate problems without reference to anything except the Apple manual. No research. No complete definition of the problem itself.

Micros encourage this kind of spontaneity: their ease of use, and the ease with which programs can be changed, make it simpler to just plunge in than to define and research the problem first.

This problem has a brighter side, however: only the microcomputer literature has added the important third aspect of a user-oriented science:

3. Knowledge should be *useful*: the microcomputer literature tests for and reviews "friendliness" of programs quite well, while the traditional literature in computer science completely ignores the issue of how easy or hard programs are to use. Hooray for us!

The very growth of our literature and available programs causes problems, however. Indices of commercial programs exist, and there is an index to the literature. Still, the field is growing so fast that it is very hard to keep current.

What does this mean for the reader with a problem? First, you should be aware that articles in the microcomputer literature will only rarely reference other articles — either in that same literature or (a more serious lack) in the general literature of computer science. There may be more efficient articles in other sources. The article you read now may be, in effect, a "plagarism" of some other author's work, and if it lacks references you may never know. Beyond this, articles themselves can't keep up with the growth of the literature.

Problem Solving Steps

We need to back up a bit, however, before charging off into either the literature or programming itself. I'd like to suggest some steps for "problem solving," as the process applies to the writing or fixing of micro programs. I'll use the example from the statistical accuracy issue.

1. Know You Have a Problem

The first problem is to figure out whether or not you *have* a problem. The reader said he/she couldn't get calculations to come out right. Obviously, a program had been written that didn't compare favorably with known correct answers. In short, the reader had done some testing, and had accurate standards against which to work. Where do you find standards? In statistics and numerical analysis there are two kinds: 1) textbook examples, and 2) results from assumedly-accurate commercial "mainframe" packages.

The *Collected Algorithms of the ACM* contain many examples with data and results (see below). This is an excellent place to start if your library doesn't contain any examples.

Testing should be done over the complete range of possible data values. In the case of the variance example, above, you would never see the effects of rounding error if you used only a few numerically-small data values in testing (and many of the textbooks use only such simple data — so beware).

2. Look for Resources

In many cases, though, the "problem" itself may be that you don't know how to write the program to do whatever you want. In either case (don't know, or looking for test data), you need to move into an "information search" mode.

This is a good place to introduce a valuable information resource: the *Collected Algorithms of the ACM* (Association for Computing Machinery). Not only does this collection cover most of the numerical, sorting, statistical, etc. algorithms in existance, but it contains certification

tests with real data and results. The algorithms are written either in FORTRAN or a generic structured language that looks much like ALGOL or Pascal. Let's look at one example. It is algorithm 66, by J. Caffrey, a simple matrix inversion method:

```
procedure Invrs (t) size : (n); value n;
real array t, integer s
begin integer i, j, s; real array
v[1:n-1]; real y, pivot
for s := 0 step 1 until n-1 do
   begin pivot =: 1.0 / t[1,1]
      for i := 2 step 1 until n do
      v[i-1] := t[1,i]
      for i :- 1 step 1 until n-1 do
         begin t[i,n] := y := -v[i] *
         pivot
         for j := i step 1 until n-1
         do
         t[i,j] := t[i + 1,j + 1] + v[j] *
         y
         end
      t[n,n] := -pivot
   end
   for i := 1 step 1 until n do
   for j := i step 1 until n do t[i,j]
   := -t[i,j]
end Invrs
```

(the only change I've made is to substitute "*" for the multiplication sign, to avoid confusion with the letter "x"). Even if you don't know the language, it is easy to rewrite this into Applesoft or whatever. More important, there are certifications, with test matrices and results, against which a rewrite may be compared. One of the certifications suggests an improvement (a "singular matrix" error exit if pivot = 0 before the first *i* loop).

Something else is worth noting. The original algorithm appeared in *Communications of the ACM* in **1961**! This algorithm is old enough to vote. Time implies that the algorithm has passed the test of time. Also, many of the algorithms developed in the "old days" ran on machines that were limited in memory and/or precision. Thus, they work well in the Apple environment.

There are also many valuable reference books on computing. Subfields such as statistics, numerical analysis, sorting, databases, etc. have their own references. Where do you find them? The best source (as for the *Collected Algorithms*) is the library of a good university computer science department. Even if you're not a student, you can usually use such a library's materials on site. Begin by telling the librarian your problem.

If you want to build your own library, you could buy a professional computer science publication, to pick up ads for computer science books. Exhaust the library resources first, however — both to learn more about the topic, and to learn which books you need.

Scientists always begin solving problems this way, right? Well, *no*. The myth is that scientific problem formulation and information gathering is based on the published literature. You might first do what scientists *actually* do: they talk to or call somebody. Every scientific field contains experts known by their peers to be "up" on the literature, and on who is doing what. These folks field a lot of calls, being paid off for their trouble by thus learning even more. The most productive scientists are those who are best plugged into the informal communication networks.

How do you plug in? First, *A.P.P.L.E.* has its own experts — our consultants and our hotline. In more specific or technical problems, check in your company or through a professional association's local chapter. Even if you live in East Nowhere you can usually find an "old hand" computer scientist with back issues of ACM publications, etc.

If all else fails, find the most recent author of a technical article in the field, an article with good references, then *call* him or her. Be prepared first, though: ask the right questions. You may find that you need two kinds of experts: one for the technical problem, and one for advanced uses of the Apple.

3. Organize

There is a logic to programming that is higher than the simple rules for writing programs in any given language. Texts such as Nagin and Legard (1978) teach "top down," "structured" programming methods. The point is to design in modular sets of routines, doing the design at a conceptual level first. You can no more learn to program, say, Applesoft, from the Applesoft manual than you can learn to write by reading a dictionary.

The key design element is that of being certain what is *causing* your problem before you design the solution. In the statistical example, the problem was not really lack of precision, but rather, choice of algorithm.

4. Code

This is where people usually begin learning to program. It is much too far a point downstream to begin. The manuals, magazines, classes, etc. all cover this level well, so I won't.

5. Test and Evaluate

One reason for modular programming is so that you can test each routine by itself. A good idea.

You can't really test a program yourself, either, any more than a writer can be their own editor. Try out your program on friends, club members, etc. If you have young children, have them try your menus and read your documentation. If a five year old can do it, there is some (perhaps faint) hope that real-world users can make the program work and not crash it.

6. Implement

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"Production" program users will find unimagined bugs and traps in even the best code? Why? Because the author and other sophisticated users know too much about what the program is supposed to do and how. They don't make the simple errors. ("Oh, you mean I have to press return?").

7. Contribute to Our Science

Ultimately, you as a programmer can have a maximum inpact (as well as pay back your debts) only if you contribute to the literature itself. Writing also helps you understand what you are doing much better. If you are a commercial programmer, you need not give away the proprietary store. There are always useful techniques and tips through which others may benefit.

Finally

The ultimate lesson from this is not so much the solution to a particular programming problem, as it is a plea for Apple users to treat what they do in a more scientific manner: engage in a cumulative, problem-solving approach to their work. There is really no excuse for inaccurate statistics, abominably slow sort algorithms, reference-less articles, etc. Microcomputerists will never be taken seriously until they learn about and build from a solid previous base, and in turn, contribute to it.

REFERENCES

Caffrey, J., Algorithm 66: INVRS. Collected Algorithms from CACM. Association for Computing Machinery. Originally published in Communications of the ACM, July, 1961.

Goodnight, J. H. (1979), A Tutorial on the SWEEP Operator, The American Statistician, August, 149–158.

Kennedy, W.J., Jr., and Gentile, J.E. (1980), Statistical Computing. New York: Marcel Dekker.

Nagin, P.A., and Legard, H.F. (1978), BASIC With Style. Rochelle Park, N.J.: Hayden.

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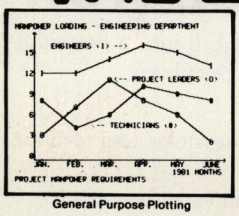

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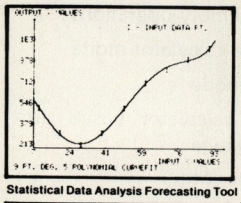

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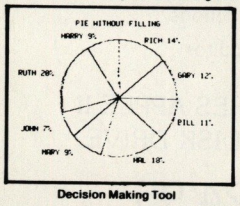

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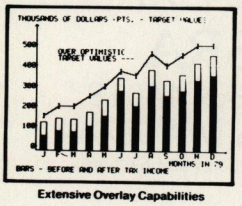

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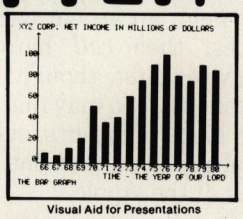

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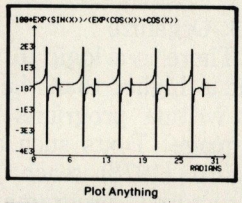

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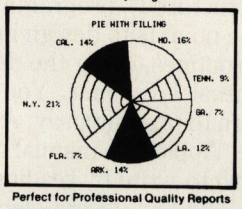

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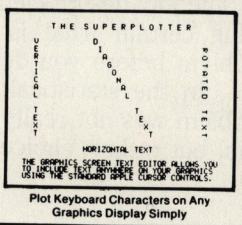

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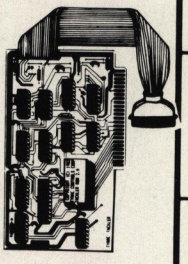

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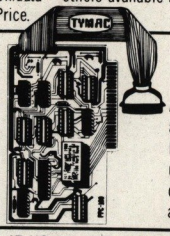

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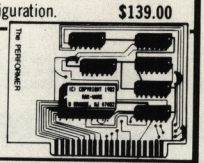

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EXTRA, EXTRA READ ALL ABOUT IT

Craig Peterson

NOW that 16K RAMcards for the Apple][are dropping to disgustingly low price levels, I'm sure that many of *Call – A.P.P.L.E.'s* readers are planning to or have already purchased one. Besides the obvious advantages of having both Applesoft and Integer Basic available on your one little computer, you can also obtain a DOS moving program to place DOS on the RAMcard. This really gives Applesoft a lot of real estate to play with. Cornelis Bonger's DOS MOVER which appeared in the July/August 1981 issue of *Call – A.P.P.L.E.* is an excellent one, and with some keyboard action on your part, all it costs is the price of a back issue. However, if you have DOS 3.3 then there is an extra bonus that you get with the purchase of a RAMcard, Programmer's Aid #1.

You Apple owners who have had your computers for a long time may recall that in the days when Apples primarily ran Integer Basic, there was an extra ROM chip that you could buy, called the Programmer's Aid #1. This chip plugged into the $D0 ROM position on your motherboard and contained a large number of utilities for Integer Basic, like renumbering, appending from cassette tape, verifying an Integer cassette program, generating musical notes from Integer Basic, and doing high-resolution graphics from Integer Basic. In addition, some non-Integer utilities were included, like verifying a machine language cassette program, a memory test for the Apple, and a program to relocate 6502 machine language programs. This chip was priced at about $50.

Well, the punchline here is that with DOS 3.3 and a RAMcard, you've just gotten that $50 chip for free. It's on your system master diskette for DOS 3.3 as part of the INTBASIC file. When you fire up the HELLO program from the DOS 3.3 system master, the loading of the 50 sector INTBASIC file brings the $D0 ROM chip right along with it. I'm assuming here that most of you probably have Applesoft in ROM on the motherboard. If you don't, you can actually get two copies of INTEGER BASIC into memory by changing the HELLO program slightly so that INTBASIC is BLOADed and then type POKE -16256,0.

When I first became aware of this extra bonus, I realized that without documentation, these features would be impossible to use. So I hurried on down to my local Apple dealer and purchased the Programmer's Aid #1 Installation and Operating Manual, #A2L0011, for about two dollars. I was particularly interested in how the machine language program relocation utility worked. I'm happily moving things all over the place now.

There is another mind boggling possibility which I haven't had time to explore yet. A new assembler called Merlin comes with a wealth of information on Applesoft Basic. By using this info, along with the 50 sector FPBASIC (Applesoft) file on DOS 3.3, and the RAMcard, it is actually possible for you to create you own custom version of Applesoft Basic, with your own special commands and everything. With one of these RAMcards, the possibilities are almost endless.

```
]LIST
5  REM
SO WHAT DID YOU EXPECT?
KEN WATTERS:CALL -A.P.P.L.E.
10  TEXT : HOME
20  FOR I = 1 TO 40:
      PRINT CHR$ (95);: NEXT
30  FOR I = 1 TO 20:
      PRINT  CHR$ (91);:
      FOR J = 1 TO 38:
      PRINT  CHR$ (32);:
      NEXT J: PRINT
       CHR$ (93);: NEXT I
35  POKE 33,34: POKE
      32,3: VTAB 3:
      LIST : POKE 32,0:
      POKE 33,40: VTAB 22
40  FOR I = 1 TO 40:
      PRINT CHR$ (45);: NEXT
50  REM   SO WHAT DID
      YOU EXPECT?
```


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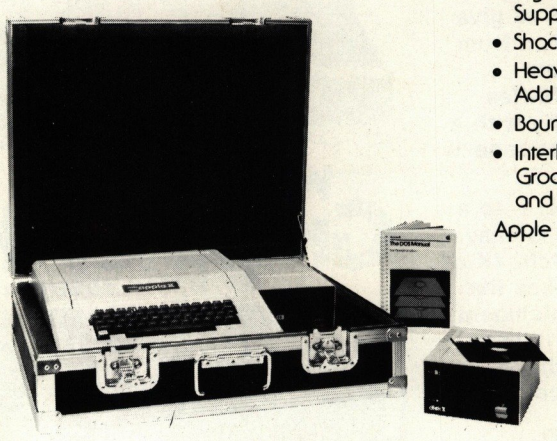

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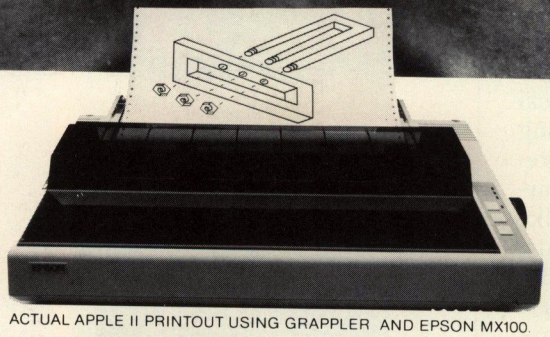

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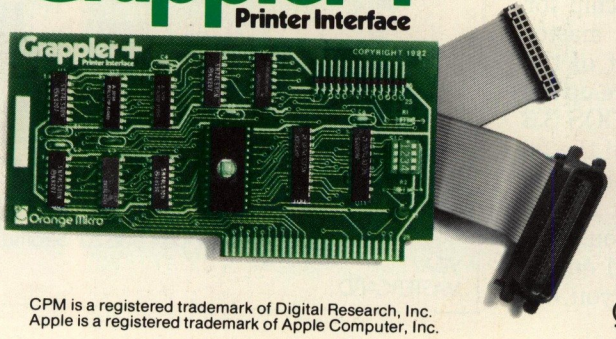

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GET-MOST WRAP-UP:

YES, YOU REALLY CAN PUT FILES ON TRACK 0

Clay Ruth /Call —A.P.P.L.E. Staff Writer

IF you've made the DOS modifications published in "Get the Most from a Diskette" (March 1982) and "Get Most Follow-Up" (April 1982), no doubt by now you have discovered that placing files on track 0 isn't as easy as I said it was!

When I tested my original patches, I moved files to my DOS-less diskette by using FID (from the DOS 3.3 System Master). At that time I didn't realize that FID has its own track/sector allocation routine which works quite differently from the one within DOS. FID readily places files on track 0. With some additional patches, DOS will also treat track 0 on an equal basis with the other 34. These additional patches are summarized in Fig. 1. Here's what is happening:

The biggest obstacle to using track 0 was the "current track allocation" byte at $B5F1 (all addresses in this article refer to a 48K system). Standard DOS 3.3 interprets a zero at $B5F1 as meaning no track is currently allocated. This makes DOS start searching elsewhere for free space. To overcome this, I changed every subroutine that uses this byte, making them interpret $FF (rather than $00) as an indication of no current allocation. This involved changing "BEQ" instructions to "BMI" at $B247 and $B279, and changing a "BNE" to "BPL" at $B2C6. It also required placing $FF at $B266 and at $B2D6. I then intercepted the routines that clear the allocation table ($B5F0-B5F5), making them place $FF at $B5F1. These intercepts occur at $AC02 and $AD91, using patches at $BCF2 and $B6C5 respectively.

The next problem was the baseline DOS uses to index into the VTOC bit maps. The normal baseline is $B3F6, which is just under the track 1 bit map image in RAM. Accessing the track 0 bit map requires a baseline of $B3F2. I changed the $F6 to $F2 at $B2A2, $B2AD, $B2F6 and $B2F9.

The new baseline requires a new calculation of the track offset. I intercepted the calculations at $B29B and $B2EB, using a patch at $BA7C.

The catalog display still wasn't right. My April patch took care of DOS's search for a specific file, but the full catalog display still interpreted track 0 as an end mark. I had to intercept the routine at $ADD7, sending it to $BA83, where a new patch allows rejection only when both the track and sector pointers for the file's T/S list are zero.

Fig. 1 – Modifications required in addition to those published in March and April, 1982, if files are to be placed on Track 0.

Note: *These all go on the Bootable Disk*

a. For Track 2, Sector 1

```
47:30
66:FF
79:30
9B:20 7C BA
A2:F2
AD:F2
C6:10
D6:FF
EB:20 7C BA
F6:F2
F9:F2
```

b. For track 1, Sector E

```
78:4C CE B6
```

c. For Track 1, Sector C

```
65:4C B3 B6
91:4C C5 B6
D7:4C 83 BA EA
```

d. For Track 1, Sector B

```
02:4C F2 BC
```

e. For Track 0, Sector 4

```
7C:A8 C8 98 0A 0A A8 60
83:30 0A D0 05 BD C7 B4
F0 06 4C DB AD 4C 25 AE
4C 2C AE
```

f. For Track 0, Sector 6

```
F2:8D FA B5 CE F1 B5 60
```

g. For Track 0, Sector 0

```
B3:48 F0 03 4C 68 AD C8
B1 42 F0 03 4C 6B AD 68
4C 70 AD
C5:9D F0 B5 CA 10 FA 4C
F5 BC
CE:AA F0 03 4C 7B AF C8
B1 42 F0 03 4C 7E AF 88
4C 82 AF
```

The standard DELETE routine steps its way through the T/S list, resetting bits in the VTOC accordingly. It stops when it sees a track 0 entry. Also, a link to a second T/S list on track 0 is interpreted as no link at all! In both cases, I had to implement the now-familiar process of checking the sector reference too, allowing rejection only when both track and sector are zero. I did this by intercepting at $AD65 and $AF78, using patches at $B6B3 and $B6CE respectively.

By now I have used up just about all the unused space within DOS. If you want to apply other DOS patches that have been published, I've probably already occupied their assigned areas. But there are other options. You might have noticed that three of my patches reside on Page $B6, which is the image of track 0, sector 0. This is usually thought of only as

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PUTTING FILES ON TRACK 0

Boot 1 image. Actually, Boot 1 only uses the first 93 ($5D) bytes and the last two. Bytes $5E through $B2 are Apple's own patches to DOS. Beyond my patches, it is still blank. You can relocate some patches to this area if you like. Just stay clear of bytes $FE and $FF – they will be changed during booting!

Another possible area for patches is the final 48 ($30) bytes of the VTOC. All those zeros from byte $D0 through $FF serve no purpose. Any patch placed here must go on your DOS-less data diskettes as well as on your modified DOS-containing diskettes so it will be available whenever needed. Failure to do so will result in a BRK and subsequent 6502 register dump somewhere between $B48B and $B4BA. These addresses correspond to bytes $D0 through $FF of the VTOC sector; its image in RAM overlaps a page boundary.

I apologize for the incompleteness of my original modifications. I am confident that, with the additional modifications presented here, you will have a DOS that makes trouble-free use of track 0. If you should discover a problem I have missed, please get in touch with me via Val on the hot line.

I wish to thank reader Jack Lewis for first bringing some of these problems to my attention, and for his assistance with developing and testing some of the patches.

```
]LIST
10 A$ = "!/-\":B$ =
     "-/!\"
15  REM
SO WHAT DID YOU EXPECT?

AUTHOR ANOM.
SUBMITTED BY JONATHAN
     KANDELL
CALL -A.P.P.L.E.
20  POKE 2060,92: POKE
     2070,92
30  HOME
40  FOR I = 1 TO 4:
     VTAB 10: PRINT
      MID$ (A$,I,1):
     PRINT  MID$ (B$,I,1)
50  FOR J = 1 TO 33: NEXT
60  NEXT
70  GOTO 40
```

The following lines may be placed at the start of any Applesoft program to POKE all required DOS patches into RAM rather than modifying the DOS on your bootable diskette. They incorporate all patches made in the three articles (Get the Most from a Diskette, Get Most Follow Up, and Get Most Wrap Up).

It is suggested that this be used as the start of the greeting program on your bootable disk. However, line 22 changes all the DATA Statements to REMarks after they are used, so it may also be attached to the beginning of a program that uses other DATA Statements.

```
Command :?PR#0
]LIST

0  DATA  200,177,66,208,7,136,173
     ,187,181,76,8,177,136,177,66
     ,76,20,177,141,250,181,206,2
     41,181,96
1  DATA  189,198,180,240,3,76,243
     ,177,189,199,180,240,3,76,24
     5,177,76,18,178
2  DATA  168,200,152,10,10,168,96
     ,48,10,208,5,189,199,180,240
     ,6,76,219,173,76,37,174,76,4
     4,174
3  DATA  72,240,3,76,104,173,200,
     177,66,240,3,76,107,173,104,
     76,112,173
4  DATA  157,240,181,202,16,250,7
     6,245,188
5  DATA  170,240,3,76,123,175,200
     ,177,66,240,3,76,126,175,136
     ,76,130,175
10 P =  PEEK (987):S = 256 * P +
     1504
11 A = S:B = S + 24: GOSUB 20
12 A = S - 631:B = S - 588: GOSUB
     20
13 A = S - 1581:B = S - 1537: GOSUB
     20
15  POKE S - 3035,76: POKE S - 30
     34,224: POKE S - 3033,P + 5:
     POKE S - 2802,76: POKE S -
     2801,105: POKE S - 2800,P +
     3
16  POKE S - 2638,169: POKE S - 4
     318,76: POKE S - 4317,242: POKE
     S - 4316,P + 5: POKE S - 343
     2,76: POKE S - 3431,206: POKE
     S - 3430,P - 1
17  POKE S - 3963,76: POKE S - 39
     62,179: POKE S - 3961,P - 1:
     POKE S - 3919,76: POKE S -
     3918,197: POKE S - 3917,P -
     1: POKE S - 3849,76: POKE S -
     3848,131: POKE S - 3847,P +
     3: POKE S - 3846,234
18  POKE S - 2713,48: POKE S - 26
     82,255: POKE S - 2663,48: POKE
     S - 2629,32: POKE S - 2628,1
     24: POKE S - 2627,P + 3: POKE
     S - 2622,242: POKE S - 2611,
     242
19  POKE S - 2586,16: POKE S - 25
     70,255: POKE S - 2549,32: POKE
     S - 2548,124: POKE S - 2547,
     P + 3: POKE S - 2538,242: POKE
     S - 2535,242: GOTO 22
20  FOR X = A TO B: READ Y: POKE
     X,Y: NEXT : RETURN
21  POKE LS + 4,178:LS =  PEEK (L
     S) + 256 *  PEEK (LS + 1): RETURN

22 LS =  PEEK (103) + 256 *  PEEK
     (104): FOR X = 0 TO 5: GOSUB
     21: NEXT
```

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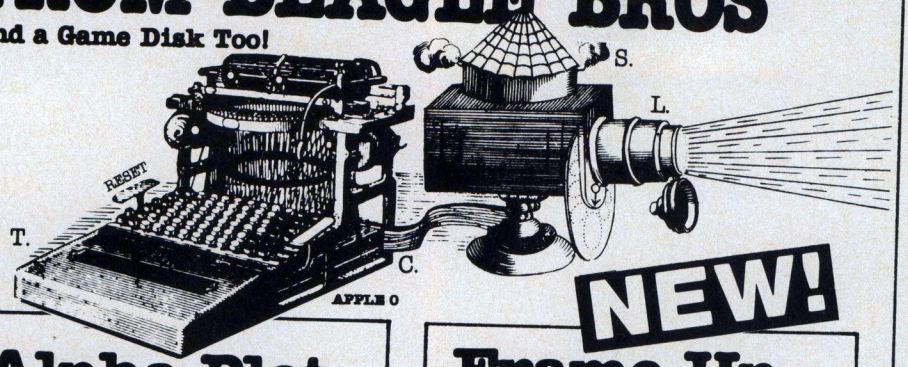

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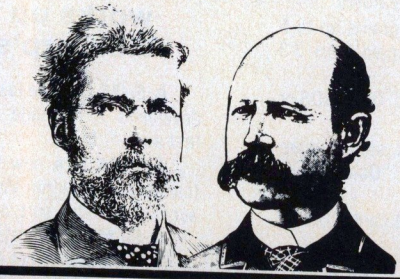

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```
10 REM HI-RES NUMBER GENERATOR
20 SIZE=5: SCALE=SIZE: REM NUMBER-HEIGHT
30 HGR: HOME: POKE 232, 0: POKE 233, 3: ROT=0
40 FOR A=768 TO 830: READ B: POKE A, B: NEXT A
50 N=N+1: N$=STR$(N): X=99: Y=0
60 FOR A=1 TO LEN(N$): HCOLOR=0: DRAW 8 AT
   X, Y: HCOLOR=3: DRAW VAL(MID$(N$, A, 1))
   AT X, Y: X=X+SIZE+SIZE: NEXT A: GOTO 50
70 DATA 20, 0, 24, 0, 27, 0, 31, 0, 35, 0, 39, 0, 44, 0,
   49, 0, 52, 0, 57, 0, 53, 62, 36, 0, 49, 38, 0, 53,
   55, 61, 0, 53, 23, 37, 0
80 DATA 46, 38, 52, 0, 61, 46, 62, 5, 0, 61, 54, 37, 7,
   0, 53, 38, 0, 54, 37, 60, 46, 0, 53, 39, 53, 62, 5, 0
```

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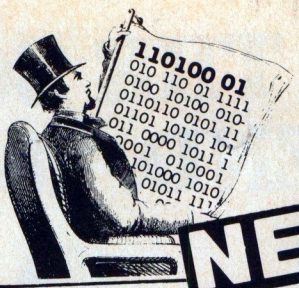

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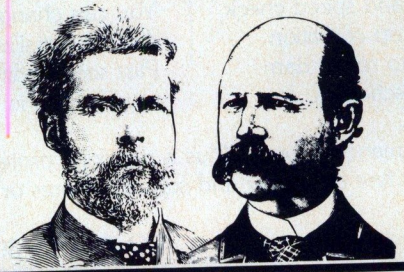

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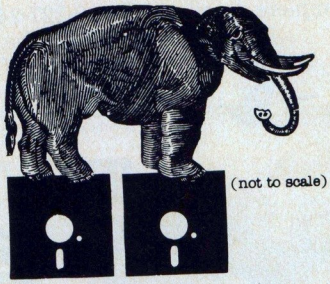
- ☐ Peeks & Pokes Chart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A CHRISTMAS PRESENT FROM A HACKER

Philip Chien

SO you want to give your friends, customers, associate, enemies, etc. a Christmas, Hanukkah, Winter Solstice, etc. present that says "I'm a hacker, I own an Apple, I forgot to get you a present till the last second, etc."?

How about a calendar with a Hi-Res picture? If you have: a printer with graphics capabilities, an Apple, the Computer Station "Enhanced Graphics Software" or other similar graphics dump programs, and plenty of paper, then you can give a special present.

The following program will dump a Hi-Res picture and print a calendar for any year after 1752 (before September 1752, England and the Colonies were on a different calendar system. Eleven days disappeared; putting any year before 1752 off by eleven or more days). Type in the program and save it onto a DOS 3.3 diskette. Use the FID program (on your 3.3 master disk) to transfer the graphics driver for your printer (i.e. TIGER460.OBJ, if you have an IDS printer model 460, 560, Prism 80, Prism 132, or MicroPrism 480) onto the same disk as the program. While you are in FID, transfer a couple of picture files onto the disk. If you don't have any pictures around that you like, contact your dealer.

Each authorized Apple dealer has two contributed diskettes from Apple (Slide Show 1 and Slide Show 2) filled with Hi-Res pictures. Any decent dealer will, and can, make you a copy of the diskette for a small charge.

Exit FID and type "BRUN DRIVER.OBJ" where DRIVER.OBJ is the name of your driver. Answer the questions concerning your printer setup. Decide what size and color-mode (plot/picture) that you want and dump a picture. Exit the graphics driver program and type "BSAVE DRIVER.OBJ,A$1800,L$800" this will tell the driver the correct size, color, and system configuration when the Calendar program runs it.

If you are using either: a printer interface card with built-in graphics capabilities (i.e. PKASO, Grappler, Practical Peripherals Microbuffer, etc.) or a different graphics driver (i.e. the driver on the Visiplot diskette) then change lines 100 and 270 as necessary. You cannot use the Zoom Grafix Hi-Res dump program because, due to the $!& copy protection system, you can't attach Zoom Grafix to your own program.

If your Apple hasn't been modified for lowercase; then just put in the names of the days of the week and month as capital letters.

If you aren't using a parallel card or Super Serial card, change line 290 to whatever [Ctrl] characters or POKE is necessary for your interface card to set the printwidth.

POKE 36,X is used instead of TAB (X) because a) it's faster, and b) it works (beyond 40 columns, tab won't work properly).

Program Statistics:

Variables

- D$ everyones favorite variable [Ctrl-D]
- S$ Name of Months
- L Length of each month in days
- Z$ Name of Days of Week
- M Month Counter
- T Day Counter
- A$ Name of Picture
- C$ Number of Columns on printer
- C Number of Columns on printer
- D Day of Week counter
- DA Date of Month counter
- A Year requested

Lines

90-150 Setup variables
160-260 Input information and load picture
270 dump Hi-Res picture
280-300 setup top of page
310-330 calculate starting day of year, and leap year if necessary
340-350 print year
360-390 set up each month
400-470 print dates of months
480-510 end year, spit out paper and go again

Source for "Enhanced Graphics Software"

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Computer Station
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St.Louis, MO 63141
(314) 432-7019
Price: approx. $55.

The Program (finally)

```
]LIST

10  REM

  HI-RES  CALENDAR PRINTER
      BY  PHILIP CHIEN

CALL -A.P.P.L.E. : DEC. 1982

90 D$ =  CHR$ (4): REM  CTRL-D (W
     HAT ELSE?)
100  PRINT D$;"BLOAD DRIVER.OBJ":
      REM  CHANGE GRAPHICS.OBJ TO
      NAME OF PRINTDRIVER
110  DIM S$(12),L(12),Z$(7)
120  FOR M = 1 TO 12: READ S$(M),
     L(M): NEXT
130  DATA  JANUARY,31,FEBRUARY,28
     ,MARCH,31,APRIL,30,MAY,31,JU
     NE,30,JULY,31,AUGUST,31,SEPT
     EMBER,30,OCTOBER,31,NOVEMBER
     ,30,DECEMBER,31
140  FOR T = 1 TO 7: READ Z$(T): NEXT

150  DATA  SUN,MON,TUE,WED,THU,FR
     I,SAT
160  TEXT : CALL  - 936: PRINT : PRINT
     : PRINT "CALENDAR PROGRAM": PRINT
     "( C) 1982 BY PHILIP CHIEN"
170  INPUT "WHAT PICTURE(CATALOG
     FOR CATALOG ,(CR) FOR PICTUR
     E IN MEMORY)?";A$
180  IF A$ = "" THEN 230: REM  PI
     CTURE IN MEMORY
```

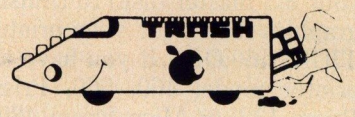
A CHRISTMAS PRESENT FROM A HACKER

```
190   IF A$ <  > "CATALOG" THEN 22
      0
200   PRINT D$;"CATALOG"
210   GOTO 160
220   PRINT D$;"BLOAD";A$;",A$2000
      "
230   GR : POKE  - 16297,0: REM  S
      ET GRAPHICS MODE, AND SHOW P
      ICTURE
240 C = 40: REM  DEFAULT PRINTER
      WIDTH
250   INPUT "YEAR?";A
260   PRINT "COLS ON PRINTER 40"; CHR$
      (8); CHR$ (8); CHR$ (8);: INPUT
      C$:C =  VAL (C$): IF C = 0 THEN
      C = 40
270   CALL 6147: REM  DUMP PICTURE

280   PRINT D$;"PR#1": REM  THE PR
      INTER BETTER BE IN SLOT 1!
290   PRINT  CHR$ (9);C + 1;"N": REM
       THIS SETS UP A PARALLEL CARD
       FOR C+1 COLUMNS OF TEXT
300   PRINT : PRINT : PRINT
310 D =  INT ((365.25 * A / 7 -  INT
      (365.25 * A / 7)) * 7 - 1.25
      )
320   IF D < 1 THEN D = D + 7
330   IF A / 4 =  INT (A / 4) AND
      A / 100 <  > INT (A / 100) OR
      A / 400 =  INT (A / 400) THEN
      L(2) = 29: REM  LEAP YEAR?
340   POKE 36,(C / 2 - 7): PRINT "
      ****";A;"****": REM  PRINT Y
      EAR
350   PRINT
360   FOR M = 1 TO 12
370   POKE 36,(C / 2 -  LEN (S$(M)
      ) / 2): PRINT S$(M): REM  PR
      INT MONTH
380   PRINT
390   FOR T = 1 TO 7: POKE 36,(T *
      C / 7 - 3): PRINT Z$(T);: NEXT
      : REM  PRINT DAYS OF WEEK
400   PRINT : PRINT
410   FOR DA = 1 TO L(M)
420 D = D + 1: POKE 36,(D * C / 7
      - 3)
430   IF DA < 10 THEN  PRINT "0";
440   PRINT DA;
450   IF D = 7 THEN D = 0: PRINT :
       REM  NEW LINE
460   NEXT DA
470   PRINT : PRINT
480   NEXT M
490   PRINT  CHR$ (12): REM  NEW P
      AGE
500   PRINT D$;"PR#0"
510   GOTO 160
32767  REM  CALENDAR  PROGRAM BY
     THE APPLE WIZARD
32768  REM  COPYRIGHT 12/26/79
32769  REM  LAST MOD 9-27-82
```


REPLAY

APPLE PROGRAM COPY SYSTEM



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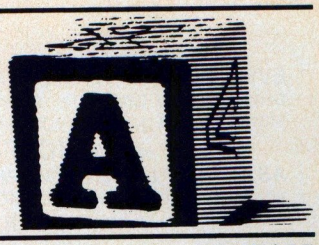
The copied program does not need the REPLAY card to execute. Two copied programs can be put on one DOS 3.3 disk. That disk is ALL that is needed to run the program.

With the packing program supplied, the copied program can be packed and Brunned from DOS 3.3 without a language card. Utilities and documentation are supplied with the system. Tutorials are given on multi-access disk analysis, copying and packing.

*Apple is a registered trademark for Apple Computer, Inc.

A IS FOR APPLE:

PRINT ASCII



Ralph H. Swerdlow, M.D./Call —A.P.P.L.E. Staff Writer

WOULD you like to have a little program that could tell you the ASCII of any symbol that you can type at the keyboard, and also tell you what CHR$(N) is for any N?

Here is such a program. It can save you the chore of looking for this information while you are programming. If you save it on your "UTILITY DISK" it will be available for your use any time you need it.

If you have only one disk drive, you can save this program on the disk that you are using while you develop your program by inserting your utility disk, and typing, "LOAD CHRASCII". Then remove the utility disk, insert your working disk, and type "SAVE CHRASCII." Then, whenever you need to know, save your working program, run "CHRASCII," and you will have the information. With two disk drives, save the program you are developing on one disk, and run "CHRASCII" from the other drive.

```
]LIST

10  TEXT : HOME
20  VTAB 5: PRINT "WHICH
      DO YOU WANT?:"
30  VTAB 10: HTAB 10:
      PRINT "(1) ASCII"
40  VTAB 12: HTAB 10:
      PRINT "(2) CHR$(N)"
50  VTAB 16: HTAB 15:
      PRINT "YOUR CHOICE";:
      INPUT A
60  IF A = 1 GOTO 100
70  IF A = 2 GOTO 200
80  IF A <  > 1 AND
      A <  > 2 THEN
       CALL  - 198:
      GOTO 10
100  HOME : VTAB 4:
      INPUT "TO FIND
      ASCII, ENTER LETTER:";
      L$
110  VTAB 8: HTAB 5:
      PRINT "ASC (";L$;")=
      "; ASC (L$)
120  VTAB 12: HTAB 10:
      PRINT "HIT ANY
      KEY FOR MORE.....":
      GET C$: GOTO 100
200  HOME
210  VTAB 5: HTAB 5:
      INPUT "ENTER N
      :";N
220  VTAB 10: HTAB 5:
      PRINT "CHR$(";N;")
      = "; CHR$ (N)
230  VTAB 15: HTAB 10:
      PRINT "FOR MORE,
      HIT ANY KEY....":
      GET C$: GOTO 200
```

Line 10 clears and sets the screen to full width. Lines 20 to 50 ask you which you would like. The VTABS and HTABS in these lines format the screen.

In line 50, you are asked for your choice. Note that a semi-colon occurs after the last quotation mark. This prevents a line feed, and the input request with its question mark is printed on the same line.

Lines 60 and 70 direct the program to line 100 or 200 depending on which key is hit, the "1" or "2" key.

Line 80 contains the command "CALL -198," which will ring the Apple's bell, and says, "If any key other than the 1 or 2 keys are pressed, sound the bell and start over again."

Line 100 begins the part of the program in which the user enters any character that can be typed. A string, L$ is formed. Study line 110 carefully because it may be confusing at a first glance. It prints what is between the first two quotation marks ASC (then L$, then the characters between the second set of quotation marks, and finally, the ASC of L$. The semi-colon concatenates, or joins these together, by preventing the line feed. Line 120 gives the user a chance to find the ASC of additional characters, if so desired, by going back to line 100.

Lines 200 to 230 clear the screen, ask for a number, and then print CHR$(N).

When you are through with this program, hit the RESET key, type, "NEW," and then continue with whatever you wish to do.

You can also use any of the nice "RENUMBER" programs and place this program high in memory, out of the way of the program you are working on, and then use it any time you wish to.

The range of N is 0 to 255, but remember that if N is less than 32, CHR$(N) is a control character and will not print. If N is greater than 192, and you have a lower case chip, you will get lower case letters printed.

Would you like a list of CHR$(N) printed for you to study?

Here is a neat program that will do it for you.

```
]LIST

10  TEXT : HOME
20  C = 0
30  FOR N = 1 TO 255
40  C = C + 1
50  PRINT "#";N;"=";
      CHR$ (N),
60  IF C = 60 THEN C
      = 0: PRINT "ANY
      KEY": GET C$:
      HOME
70  NEXT N
```

Line 10 should be obvious. Line 20 sets C to 0. This will be used to print CHR$(N) one screen full at a time. Line 30, starts a "FOR-THEN" loop, increasing N from 1 to 255. Line 50 prints, "#N = CHR$(N)." Note the use of the comma which ends line 50. In Applesoft, the comma acts somewhat like a tab, printing out into columns. Line 40 causes C to be increased each time the program loops. When C = 60, twenty lines have been printed to the screen, and line 60 then stops the program, sets C back to 0, and then asks you to press any key. The screen is then cleared and the next group of CHR$(N) will be printed in a tabbed format three columns across your screen.

If you have a printer, you can use this program to print these out so that you have a permanent hard copy to review at your leisure by adding line 5:

```
5 D$ = CHR$(13) + CHR$(4):
  PRINT D$;"PR#S"
```

with S equal to the Slot number in which you have your printer.

By studying these two simple programs and pages 8 and 15 of *The Apple][Reference Manual,* and page 138 of the *The BASIC Programming Reference Manual,* your knowledge of the ASCII representation of characters, as well as your computing skills, will be greatly increased.

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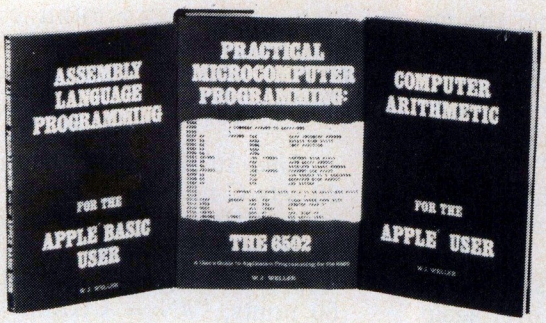

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```
]LIST
10  REM

SO WHAT DID YOU EXPECT DEPT

JONATHAN KANDELL-CALL -A.P.P.L.E.

13  HOME : LIST
100  CLEAR
110 A =  RND (1) * 22 + 1:B =  RND (1) * 22 + 1
120  VTAB A:C =  PEEK (40) +  PEEK (41) * 256:
     VTAB B:D =  PEEK (40) +  PEEK (41) * 256
130  FOR I = 1 TO 39:A$ = A$ +  CHR$
     ( PEEK (C + I)):B$ = B$ +  CHR$
     ( PEEK (D + I)): NEXT
140  VTAB A: PRINT B$: VTAB B: PRINT A$: GOTO 100
```

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A Call —A.P.P.L.E. Review:

PASCAL FROM BASIC

David G. Sparks/Reviewer

Addison-Wesley Publishing Company
$12.95 (1982 182 pages)

MOST of the readers of this magazine are beyond the beginning stages of their experience with the Apple. A good many readers are quite proficient, and turn to these pages to refine skills and knowledge already hard-won through experience.

Thus it is a pleasure to introduce this new book about Pascal. For the first time in this reviewer's experience, someone has produced a guide to Pascal which assumes the reader already is an able programmer in BASIC.

Brown even begins by pointing out the things we always believed were BASIC's strong points: superior string handling, straightforward program entry, line-numbered layout, ease of program editing and testing, direct memory manipulation via PEEK and POKE, no need to deal with an awkward-seeming operating system (just turn'er on and go), and last but not least, our very familiarity with BASIC, which makes us wonder why we should ever need to learn any other language.

He honestly admits that the appearance of a Pascal program to someone raised on BASIC is unnerving, if not downright bizarre. He includes a delightful cartoon which says, "Using (a well-known operating system) is like kicking a dead whale along a beach."

But the book is about Pascal, after all, so Brown valiantly presses on to discuss the merits of the language. What keeps the reader going, at least at first, is the delightful style of writing which commences at the beginning and carries pleasantly along to the very end.

It is already clear that this book does not tout Pascal as the be-all and end-all of computer science. But Brown believes that Pascal is worthy of any serious programmer. This candid, even-handed approach makes his the first Pascal book which this BASICally biased reader truly enjoyed, and read at one sitting, for that matter.

He uses the reader's ability with BASIC as a teaching aid. Programming concepts already familiar in his reader's "native" language are translated into fully idiomatic, fluent Pascal. As Brown puts it, his purpose is "Changing the way you think... about solving programming problems. The mechanisms offered by Pascal...allow you to set about problems in radically new ways. Thus when we talk about "learning Pascal" we mean a lot more than learning the grammatical and semantic rules of the language."

In an effort to be "serious without being solemn," Brown's book is populated with charming characters. Two of them come along quite early.

"Bill Mudd has been programming in BASIC for twenty years. One of his programs is 10,000 lines of BASIC, and it works — at least most of the time. His comments... were not encouraging.

"Pascal looks to me like a language for head-in-the-clouds academics, who have never written a real program in their lives," he said. [And Bill went on to say a great deal more which was, to say the least, unflattering.]

"Rather upset by Bill's uncouth attitude, we consulted our other friend, Professor Primple. The Professor is fanatically keen on Pascal. He has, like Bill, had twenty years of writing programs. He has written solutions to the eight queens problem in thirty different programming languages,... and, best of all, has encoded Ackermann's function in seventy-two languages.

"Converting the heathen is always worth doing, I suppose,' he told us, scratching his little beard in his characteristic way..."

Bill and the Professor pop up repeatedly. They are joined by Mrs. Buzz, Perkins the security guard, along with the two bad guys of programming, Mr. 869704 (who thinks the whole world can be described by a sufficient quantity of numbers) and Frank Round (whose name came out of an automatic language translating program, when trying to interpret "open circuit"). Honest, this is a serious book!

Brown argues that Pascal's peculiarities are among its great strengths. That it requires variables to be declared and typed separately from the body of the program is good, he argues, because this makes sure that variables aren't scattered like breadcrumbs throughout the program text. Bugs, the Professor might suggest, are better squashed when bunched together.

The structuring of data is much more elaborate in Pascal than in BASIC, causing many humorous hoots of derision from Bill Mudd. In addition to integers, reals, characters, and strings, Pascal employs arrays and something called "records" to build new data types capable of considerable sophistication. Brown gives the example of complex numbers, in which each value has both a real number component, and an imaginary part.

Pascal allows a TYPE declaration such as

```
TYPE COMPLEX = RECORD
        REALPART : REAL;
        IMAGINARY : REAL;
        END;
```

The program would also contain a VAR declaration in which A, B, and C are defined to be of type COMPLEX. Each component of A is addressed separately, as in

```
A.REALPART := 17.5;
A.IMAGINARY := 3.12;
```

The programmer might write a procedure to add two such complex variables and report the sum in a third. Within the program, the call to the procedure, with an enlightening comment, might appear as

```
ADDCOMPLEX (A, B, C);
(* C = A + B *)
```

This writer's fantasy is a TYPE declaration in which a single variable type is built up from many sub-types, which holds all the information one could possibly imagine about a book. Follow along, if you please...

First we must build from rudimentary data types. Therefore

```
TYPE
   statement    = string;
   pagenum      = 1..999;
   chapnum      = 1..25;
```

—●→

leading to a slightly more complex

```
sentence      = array[1..50] of
                statement;

  (*Sentence actually describes an
  entire page, since it is an array of
  up to 50 single statements. Any
  given statement can be extracted
  by specifying "sentence[X]".*)
```

As we build, we get into less familiar territory, but it is still relatively easy to follow what is going on.

```
humanname =
  record
    first : string;
    middle : string;
    last : string;
  end;
(* We can thus sort by either first
or last name. *)

chapter       =
  record
    chapname : string;
    firstpage : pagenum;
    lastpage : pagenum;
  end;
```

and finally

```
BOOK          =
  record
    title : string;
    author : humanname;
    numofpages : pagenum;
    numofchapters : chapnum;
  contents:
    array [1..25] of chapter;
  page :
    array [1..999] of sentence;
  end;
```

Contemplate a variable named WORTHYBOOK of TYPE BOOK. One could assign WORTHYBOOK.TITLE := "Pascal from BASIC." WORTHYBOOK.NUMOFPAGES := 182. WORTHYBOOK.AUTHOR.LAST := "Brown." Properly filled in with its data, WORTHYBOOK is a wealth of information collected into one variable. A command to WRITE (WORTHYBOOK.CONTENTS [8].CHAPNAME) would print the title of chapter 8, "Records." A futuristic, talking computer might even be able to comply with the instructions in a user-programmed procedure to READALOUD (WORTHYBOOK, WORTHYBOOK.CONTENTS [8].FIRSTPAGE, WORTHYBOOK.CONTENTS [8].LASTPAGE)!

Our imaginary variable, WORTHYBOOK, contains so much information that it would not fit on a single diskette. Yet, if the storage peripheral were capacious enough, the entire mass of information, both string and numeric, could be written to a file called SHELF with a single PUT(SHELF) command, and later retrieved by a single GET(SHELF).

What's much more important is that months from now, when coming back to do additional work on the program, the programmer will find it much easier to figure out what is going on amid such complexity. The structuring requirements of Pascal impose organization on the data such that human beings can cope with it better. Just try to imagine how a BASIC puddle of parallel arrays might be constructed to duplicate the comprehensive and versatile BOOK structure illustrated here. In all candor, this BASIC veteran's brain balks at the attempt.

The power of data definition sets Pascal clearly apart from BASIC, and Brown makes his point here with subtlety far superior to that of your reviewer (who tends to come on like 76 trombones).

Pascal doesn't have GOSUB. Instead, the programmer creates PROCEDURES and FUNCTIONS, with names somewhat suggestive of their purpose. These then become new words which the actual program may use as if they were natural-born program words. Put another way, Pascal allows the programmer to build his or her own programming vocabulary, and make the words of the program take on precisely the meaning the programmer desires.

With great civility and British wit, Brown leads his reader to see how all this is done.

Brown acknowledges that BASIC is the best way to write short, quick programs. Pascal's power becomes recognized when long programs are developed by one or more persons over a period of time. Breaking the program into data structures and clearly defined, named procedures and functions allows superior readability.

As an added bonus, Pascal prevents procedures and functions from tromping on one anothers' variables. This allows several programmers to work simultaneously on different parts of a program. The structural requirements standardize the way the parts fit together such that they will mesh with a minimum of trouble. Thus sayeth Brown.

Pascal is not something one can simply read, mark, learn, and inwardly digest. The language wasn't built in a day, and can't be learned in one. But once learned, it has attractions far beyond rude snob appeal.

This reviewer was never able, despite reading seven previous books on the subject, to gain much interest in Pascal. None of the books made the learning effort seem worthwhile. This one did.

Brown's book has that "certain something" we have wanted for more than a year. It is a charming invitation to take up Pascal. You will still need other books to show you how. But this book shows you why.

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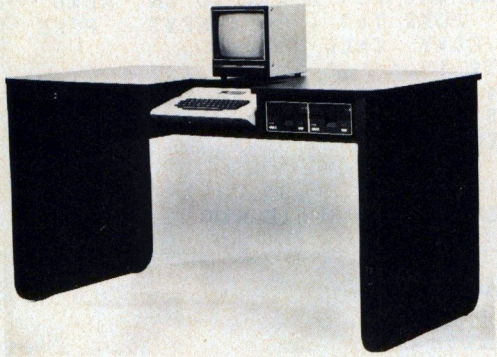

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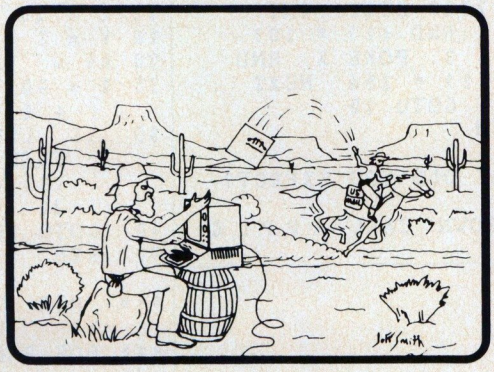

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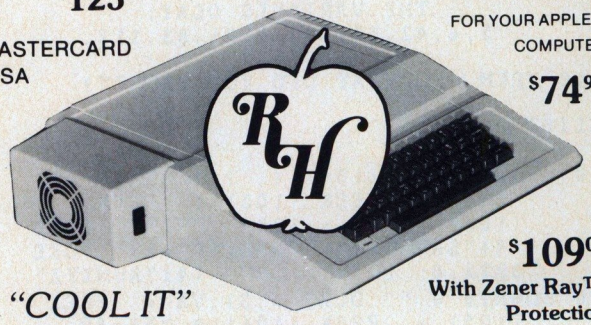

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SO WHAT DID YOU EXPECT DEPT.?

```
]LIST
10  HOME :VT = 8
20  VTAB VT: PRINT "TWO PROGRAMMA
    TICAL PROBLEMS FOR PERUSAL"
30  VTAB VT + 2: HTAB 19: PRINT "OR"
40  VTAB VT + 4: HTAB 8: PRINT "S
    O WHAT DID YOU EXPECT?"
50  IF  PEEK ( - 16384) < 128 THEN 50
60  HOME : POKE  - 16368,0: POKE
    - 21899,160: CALL  - 23186:
    CALL  - 23174
70  REM  ALL PROGRAMS, AND MODS T
    O STANDARD DOS WRITTEN BY BR
    IAN L. MATTHEWS

]LIST

10 : IF  PEEK (104) <  ) 12 THEN
    LOMEM:  PEEK (105) +  PEEK
    (106) * 256 + 1024: PRINT  CHR$
    (4)"SAVEXYZ": POKE 104,12: POKE
    3072,0: PRINT  CHR$ (4)"RUNXYZ"
20 SOWHT$ = "":DLAY = 112:VA =  PEEK
    (105) +  PEEK (106) * 256:AD
    =  PEEK (175) +  PEEK (176)
    * 256 - 26
30  POKE VA + 2,23: POKE VA + 3,A
    D - 256 *  INT (AD / 256): POKE
    VA + 4,AD / 256
40  HOME : POKE 35,25: FOR A = 1 TO
    24: FOR B = 0 TO 1: VTAB A: POKE
    41, PEEK (41) + 4 * B: POKE
    50,255 - 192 * B
50  IF A < 4 OR A > 21 THEN  PRINT
    SPC( 40): GOTO 70
60  PRINT  SPC( A - 4)SOWHT$ SPC(
    21 - A)
70  NEXT : NEXT : POKE 35,24: VTAB 1
80  READ LN: FOR A = 1 TO LN: READ
    B: POKE 767 + A,B: NEXT : POKE
    0,DLAY: CALL 768
90  DATA 19,164,0,136,208,253,173
    ,84,192,164,0,136,208,253,17
    3,85,192,76,0,3
100  REM " SOME GOOD VALUES FOR
        THE VARIABLE DLAY:
      5,6,42,57,64,70,76,83,112,
          130,187
110  REM  SO WHAT DID YOU EXPECT?

]LIST

10 : IF  PEEK (104) <  ) 12 THEN
    LOMEM:  PEEK (105) +  PEEK
    (106) * 256 + 1024: PRINT  CHR$
    (4)"SAVEXYZ": POKE 104,12: POKE
    3072,0: PRINT  CHR$ (4)"RUNXYZ"
20 SOWHT$ = "":DLAY = 31:VA =  PEEK
    (105) +  PEEK (106) * 256:AD
    =  PEEK (175) +  PEEK (176)
    * 256 - 26
30  POKE VA + 2,23: POKE VA + 3,A
    D - 256 *  INT (AD / 256): POKE
    VA + 4,AD / 256
40  HOME : POKE 35,25: FOR A = 1 TO
    24: FOR B = 0 TO 1: VTAB A: POKE
    41, PEEK (41) + 4 * B: POKE
    50,255 - 192 * B
50  IF A < 4 OR A > 21 THEN  PRINT
    SPC( 40): GOTO 70
60  PRINT  SPC( A - 4)SOWHT$ SPC(
    21 - A)
70  NEXT : NEXT : POKE 35,24: VTAB 1
80  READ LN: FOR A = 1 TO LN: READ
    B: POKE 767 + A,B: NEXT : POKE
    0,DLAY: CALL 768
90  DATA 19,165,0,32,168,252,173,
    84,192,165,0,32,168,252,173,
    85,192,76,0,3
100  REM " SOME GOOD VALUES FOR
        THE VARIABLE DLAY:
          21,31,39,55,56
110  REM  SO WHAT DID YOU EXPECT?
```

```
PROGRAM SO_WHAT_DID_YOU_EXPECT;

{ by Tim Jackson }

{ Call -A.P.P.L.E. }

VAR SOWHAT : RECORD CASE INTEGER OF
                1 : (SO : INTEGER);
                2 : (WHAT : ^STRING)
                END;
     DID     : STRING;
     YOU,
     EXPECT : INTEGER;

BEGIN
DID:='SO WHAT DID YOU EXPECT''';
WHILE NOT (LENGTH(DID)=39) DO DID:=CONCAT(DID,'');
FOR YOU:=0 TO 2 DO
  FOR EXPECT:=0 TO 7 DO
    BEGIN
    SOWHAT.SO:=1024+40*YOU+128*EXPECT;
    SOWHAT.WHAT^:=DID
    END
END.
```

```
]LIST

5  GR : POKE  - 16302,0:
     CALL  - 1998
10  FOR X = 1024 TO
      2039 STEP  INT
      ( RND (1) * 10)
      + 3: POKE X, RND
      (1) * 256: NEXT
      : GOTO 10
20  REM

SO WHAT DID YOU EXPECT?

DAVE BROWN : CALL -A.P.P.L.E
```

```
]LIST

10  REM

SO WHAT DID YOU EXPECT?

KEN KASHMAREK : CALL
     -A.P.P.L.E.
12  REM
FIRST KEY IN THIS PROGRAM,
     REMOVE
ALL DISKS FROM DRIVES,
     THEN RUN
100  POKE 512,195: POKE
     513,204: POKE
     514,197: POKE
     515,193: POKE
     516,210: CALL
     65392
```

```
]LIST

10  HIMEM: 16384:
    LOMEM: 8191
12  HOME : HGR
15 X = 20
16 Y = Z = 0
20 A$ =  CHR$ (62)
25 X = 40 *  RND (1)
     + 1
30  IF  LEN (A$) < X
     THEN A$ =  CHR$
     (8) + A$: GOTO
     30
40  GOTO 20
90  REM

***  HGR STRING  ***

*** BOB RAGSDALE ***

* CALL -A.P.P.L.E. *
```

CTRL-C KILLER

S. Scott Zimmerman

I did it in self-defense! I admit that I killed [Ctrl-C], but it was killing me! I had written an innocent Applesoft program which used almost all of the control keys. But many times when I meant to press [Ctrl-X] or [Ctrl-V], I accidentally pressed [Ctrl-C]. My program died on the spot.

My weapon of self-defense is this short assembly language routine Ctrl-C Killer. It is only 42 bytes long, and I stuck it near the top of page three (at $3A2 = decimal 930, above my tone routine at $300 = decimal 768). Killer is completely relocatable.

Ctrl-C Killer is similar to the program ERR-RING written for *Call -A.P.P.L.E.* (February 1981) by Darrell Aldrich, which was suggested to me by Val Golding. The idea behind ERR-RING is to intercept the Apple's output and replace a [Ctrl-G] (bell) with a short tone routine. In Ctrl-C Killer, the keyboard *input* is intercepted and [Ctrl-C] is replaced by a "space" character or some other character of the user's choosing. Actually, Ctrl-C Killer replaces the monitor KEYIN routine, which, among other things, processes keyboard input. For details, consult the Apple] [Monitors Peeled, pages 17-28.

After you type in the listing and assemble it (I use Big Mac), you can BRUN the object program from the keyboard or from within your Applesoft program with PRINT CHR$(4); "BRUN CTRL-C KILLER". Alternatively, you can BLOAD CTRL-C KILLER, then CALL 930. From then on, typing a [Ctrl-C] will usually behave just like pressing the space bar. If you want [Ctrl-C] to act like some other character, just POKE 207,n where n is an ASCII character value 0-255. For example, POKE 207,135 will cause the BELL to sound when [Ctrl-C] is pressed; POKE 207,160 will restore it to "space." POKE 207,131 will essentially disable Ctrl-C Killer since [Ctrl-C] is character 131 ($83). Another way to disable Ctrl-C Killer is to press RESET. To reconnect Ctrl-C Killer, type CALL 930.

Here are a few more notes related to Ctrl-C Killer:

1. ONERR...GOTO will sometimes work to keep [Ctrl-C] from killing your program without having to use Ctrl-C Killer. But ONERR has some problems, and in many cases just doesn't work. With Ctrl-C Killer in the system, *and* with an ONERR...GOTO command, pressing [Ctrl-C] will cause the program to execute the GOTO and give an error #255 (see Applesoft Reference Manual, page 81).
2. Without Ctrl-C Killer, the GET statement will accept [Ctrl-C] without killing the program, but if you press [Ctrl-C] at any other time during execution, you will get bounced out of the program. Ctrl-C Killer will keep you or anyone else from exiting the program at the wrong time.
3. After Ctrl-C Killer is BRUN, a GET or INPUT statement will pick up a "space" (or whatever other character is POKEd into location 207) when [Ctrl-C] is pressed.
4. If you use the syntax

```
100 KB = PEEK (-16384):
    IF KB < 128 THEN 100
```

in your Applesoft program, pressing [Ctrl-C] at that point will usually kill the program. Your self-defense weapon again is Ctrl-C Killer. For best results, BRUN Ctrl-C Killer and then after statement 100 above, place the command

```
110 IF KB = 131 THEN 100
```

Pressing [Ctrl-C] will then have no effect whatever on your program. Without statement 110, KB will *usually* be set to 131 and the program will execute what comes after statement 100. I say *usually* because sometimes the program will not know that [Ctrl-C] has been pressed. In any case, KB will *not* be set by the value at location -16384 ($C000), nor by the value placed in the accumulator after a key is pressed.

5. Ctrl-C Killer will disable [Ctrl-C] even when you *want* to use it, such as aborting a program LIST or getting out of the monitor. Hitting RESET is the only way to abort the listing, and 3D0G or RESET will get you out of the monitor.
6. Ctrl-C Killer will function only with Applesoft INPUT and GET commands. When a keyboard read is used (X = PEEK -16384), program execution will not be interrupted, but X will contain 131 (the negative ASCII value of Ctrl-C). In Integer Basic, the killer prevents aborting a program with Ctrl-C, but the character substituted becomes a "0", rather than a space. If PLE or GPLE are in residence, they will be temporarily disabled by Ctrl-C Killer. PLE or GPLE can be reenabled with & or call 1016, which will also disable Ctrl-C Killer.

So...if [Ctrl-C] is killing your Applesoft programs, kill it first with Ctrl-C Killer. It's all in self-defense.

About the Author

Dr. S. Scott Zimmerman is assistant professor of chemistry at Brigham Young University, Provo, Utah 84602. He is developing computer-based educational software in biochemistry on the Apple to be published by John Wiley & Sons.

```
]LIST
5  REM
SO WHAT DID YOU EXPECT?
JONATHAN KANDELL : CALL
      -A.P.P.L.E.
10   DEF  FN H(X) = X
20   INPUT "NUMBER 0-254";LI:
       POKE 50, FN H(LI):
     POKE 51, FN H(LI)
30   LIST : GOTO 10
100   REM  SO WHAT DID
      YOU EXPECT?
```

CTRL-C KILLER

```
:ASM

                    ********************************
                    *                              *
                    *        CTRL-C KILLER         *
                    *                              *
                    *    by S. Scott Zimmerman     *
                    *                              *
                    * Call -A.P.P.L.E. : Dec 1982  *
                    *                              *
                    *      This replaces the       *
                    *   monitor KEYIN routine at   *
                    *   $FD1B  (See Apple Ref.     *
                    *   Manual, page 165), and     *
                    *   converts CTRL-C to a       *
                    *   "space" (=$A0), or (with   *
                    *   POKE 207,n) to any other   *
                    *   ASCII number n.            *
                    *                              *
                    ********************************


                          ORG   $3A2        ; = decimal 930

                    BASL    =     $28         ;Screen position
                    KSWL    =     $38         ;Monitor keyboard input switch
                    RNDL    =     $4E         ;Random number
                    CHAR    =     $CF         ;Replacement char (at dec 207)
                    DOSVEC  =     $3EA
                    KEYBD   =     $C000       ;Keyboard input location
                    STROBE  =     $C010       ;Clear input


                    *   Initialization:

03A2: A9 A0               LDA   #$A0        ;Default " " (space) as
03A4: 85 CF               STA   CHAR        ; the replacement char
03A6: A9 B2               LDA   #<CTRLC     ;Set keyboard input vector
03A8: 85 38               STA   KSWL        ;Put it in input switch
03AA: A9 03               LDA   #>CTRLC
03AC: 85 39               STA   KSWL+1      ;HOB of input switch
03AE: 20 EA 03            JSR   DOSVEC      ;Let DOS know
03B1: 60                  RTS


                    *  Keyboard intercept routine:

03B2: E6 4E         CTRLC   INC   RNDL        ;Incr random number
03B4: D0 02               BNE   CTRLC2
03B6: E6 4F               INC   RNDL+1
03B8: 2C 00 C0      CTRLC2  BIT   KEYBD       ;Key pressed?
03BB: 10 F5               BPL   CTRLC       ;No, loop
03BD: 91 28               STA   (BASL),Y    ;Yes, replace flashing screen
03BF: AD 00 C0            LDA   KEYBD       ;Get the pressed key
03C2: C9 83               CMP   #$83        ;Was CTRL-C pressed?
03C4: D0 02               BNE   CONTINUE    ;No, just continue
03C6: A5 CF               LDA   CHAR        ;Act like CHAR was pressed
03C8: 2C 10 C0      CONTINUE BIT  STROBE    ;Clear key strobe
03CB: 60                  RTS

--End assembly--

42 bytes

Errors: 0
```

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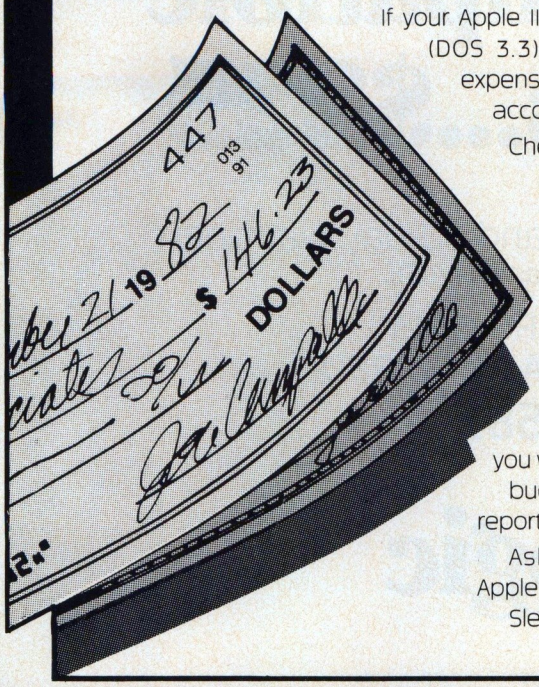

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ROBOTICS SERIES

Michael Thyng

2. The Systems Analysis

THIS month I want to go through the steps necessary to define what the robot should do, what it should look like, and what it should be made of. I want to approach the project the way any good Systems Analyst should. That approach is characterized by the following steps:

1. Define the Problem
2. Establish the Scope of the Project
3. Get the User's Approval
4. Design the System
5. Write the Programs
6. Test the Programs
7. Implement the System
8. Get the User's Buyoff
9. Evaluate the System

Remember, this is intended as a learning experience and it will be of greater value if everyone participates. If you see some spot where you think I've missed the boat, be sure to write me.

Defining the problem

In this instance, the problem we are dealing with is defining what we want, what we want it to do, and what we want it to look like. We want a robot. But what kind of a robot? There are industrial, heavy duty robots. There are chess-playing robots that move the pieces for you. There are mechanical arms that hook up to computers that people call robots - but aren't. There are toy robots that "walk" or roll across rooms until they bump into something and stop. There are little wind-up robot-shaped toys that "walk" across tables. There are robots like "Denby" at computer fairs that flirt with young ladies.

My original idea was to build something that did what I told it to do. I figured that if I had complete control of a mechanized object, then I really had a magnificent robot. But in doing my research for this project I came across something that made me change my thinking. I'd like to quote to you from David L. Heiserman's book "How To Design And Build Your Own Custom Robot." In reference to robots as machines, he says, "I have never lost the impression that such machines can, and should be regarded as pets and companions."

That impression colors all my thinking about robots and machine intelligence in general. Unlike so many other experimenters, I have a hard time thinking about these machines as potential slaves that are programmed to do my bidding. I am convinced that thinking about machines as slaves clamps an impenetrable lid on an experimenter's imagination. it seems to straightjacket one's thinking.

"Just play this little game in your head for a couple of weeks. Force yourself to think of robots as pets and companions, instead of slaves. Dream about a machine that can tell you what *IT* wants to do. Censor any thought about your playing a direct role in dictating the machine's behavior. As you work through this exercise, you will find your impression of robots blossoming into new and exciting dimensions. Don't let 'reality' mess up your dreaming! Let yourself go and you'll begin painting a remarkable mental image."

I played that mental game and came away convinced. Now I think my original objective was just a way of making a fancy radio controlled car. I really want to build a robot that will be able to move around my house and tell me what it is discovering. I want it to be able to pick things up and examine them. I want it to get smarter and smarter. And I want to have some way of interacting with it. And, I want to watch it "learn."

The problem then, is to build a working robot that can learn about its environment (both animate and inanimate) and make its own decisions about how it chooses to react to that environment. And I want it to communicate those experiences to me in some form. That robot should look like something I would want to see day after day in my home. It should be made of something that is aesthetically pleasing, yet durable enough to withstand the rigors of bumping furniture.

Establish the goals or limits

Here I want to define the constraints or limits that will govern the project.

1. The robot should be able to move around a flat indoor environment. It must be able to move across both carpet and linoleum.
2. It should be built to move on wheels rather than "legs."
3. It should look like some special little creature that would psychologically endear itself to humans. *(How about "E.T.". . . ed.)*
4. Its internal guidance should be a microprocessor. The microprocessor must be able to receive its program from the Apple][. That way the Apple][can be utilized for programming, and the completed program downloaded to the robot.
5. It should have a radio link to communicate its "thoughts" and experiences to an Apple][computer.
6. There should be no hard connection between the robot and the Apple][.
7. The total cost of the robot project should be less than 700 dollars.
8. The total weight should be less than 25 pounds, with optimum weight at 20 pounds. That way, it can be moved around more easily. The less it weighs, the less energy it requires between recharges.
9. It should have an arm capable of lifting a minimum of 1 lb.
10. It should be able to tell when its power is getting low and seek a source of replenishment.
11. It should have enough on-board sensors to keep itself from harm.
12. It should have sensors of sufficient quality to distinguish different shapes of approximately the size of a pop can or cup.

—◉→

13. It should be goal oriented on multiple levels. For example, On the most basic level, humans have the goal of continued breathing. On a higher (or lower) level, we have a goal or desire to eat. On a still higher level we have a desire for knowledge. And on it goes. Now I may have stated the concept incorrectly, but I think you can understand the idea I'm trying to express here.
14. It should have a personality of its own.
15. It should be able to run a minimum of 2 hours between recharges.
16. Aluminum should be used wherever feasible. It is abundantly available, and has an acceptable strength to weight ratio.

Get the user's approval

Since I am the primary user and designed the project, I essentially have given the project "go-ahead" approval.

Design the system

This is a toughie. If I was an engineer with a substantial budget, I would specify the kinds of parts I chose to use, the exact design to which this project would conform, and the kind and capability of microprocessor that "had" to be used. Unfortunately for uniformity, that just isn't the case. I don't know what kind of motors will be used because they will be purchased based on a price/performance trade-off. I don't know what kind of batteries, microprocessor, wheels, or specific sensors will be used either for the same reason.

What then can be designed? The general size, shape, and type of locomotion can be designed now, with the understanding that all dimensions are negotiable - not fixed. I want to have a finished robot that will be large enough to be seen in time to avoid bumping it accidently while walking through the house. Making it a little on the large size would be an advantage for any bulky parts we may try to put in. There would be some natural size limitations imposed. One is the size of the average doorway. The other is the power consumption/weight trade-off. Based on what I have read, Lead-acid batteries are the only practical power source for this price range and robot size. I think I'll use separate batteries for motive and circuit power.

Next time - where to go for materials.

If you are interested in contributing ideas to this project, WRITE to me at:

Michael Thyng
Robotics Project
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I will answer all your reasonable questions as quickly as possible either by return mail or through this column.

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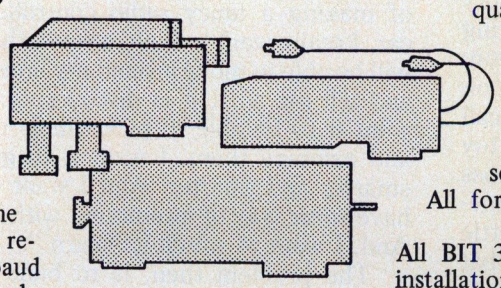

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OUR BIGGEST CONTEST YET!

BEGINNING now, we are accepting entries for our EAMON ADVENTURE Contest. Don Brown, our September A.P.P.L.E. meeting guest, wrote the original EAMON ADVENTURE game. He and other creative people have written many adventures since then. There are currently about 30 adventures, all public domain software and all available from A.P.P.L.E.

Your mission, if you choose to accept it, is to write a new EAMON ADVENTURE.

The Rules:

1. All A.P.P.L.E. members are eligible to enter except EAMON creator, Don Brown and A.P.P.L.E. employees.
2. Don Brown will judge the entries and select the first, second, and third place winners. His decision will be final.
3. All adventures submitted become property of A.P.P.L.E.
4. To have your adventure eligible for judging, it must be within the bounds of good taste. Use your own best judgement. Observe any of the currently available adventures for additional guidance. It should be in English. The decision of the Contest Coordinator or the Judge shall be final.
5. No entries will be returned.
6. All adventures deemed eligible for judging will become public domain software. A.P.P.L.E. will make copies of them available for purchase after the contest.
7. Your adventure must conform to the format established by Don Brown. You can see the format on any of the EAMON ADVENTURES which are available from A.P.P.L.E.'s "As-is" software. On Volume 144, Don Brown has set up an adventure creation disk—which also contains THE BEGINNERS CAVE.
8. All adventures must be winnable. That is, if it is impossible for a character to ever make it through your adventure without being killed, then your adventure does not meet the requirements for eligibility. Note, you don't have to be able to win every time, it just has to be possible with some regular characters.
9. Hints: Don Brown does appreciate puns. Consider a theme for your adventure and carry that through your adventure. The EAMON ADVENTURE called Death Star was a Star Wars take-off. You might consider something that is happening or has happened in the news. Or consider Politics, Sports, Education, the Arts, the Computer Industry, a TV program, something based on your job, the future, the past, or something funny, scarey, or intellectual.
10. The deadline. All program diskettes must arrive by Midnight, Monday, February 28th, 1983 and will not be returned.
11. All entries must be on 5 1/4 inch floppy diskettes.
12. Mail one or two diskettes to the contest director. If the disk drives that the Judge or Contest Director use cannot read your diskette, your entry will be rejected. You might consider mailing two diskettes to help ensure that we can read your entry.
13. All contest adventures must be able to be run after the Beginners Cave, just as all other adventures are.
14. We expect between 20 and 100 adventures to be entered in the contest. Consequently, it may be quite some time after February 28th before we know who the winner is. Because of that we can't tell you exactly when the winner will be announced. However, the Contest Coordinator will tell you how many entries were received and how many were deemed eligible shortly after February 28th.
15. You may enter as many different adventures as you wish.
16. Mail your entries to:

    EAMON Contest Coordinator
    c/o A.P.P.L.E.
    304 Main Ave. S.
    Renton, WA 98055

17. If you have questions, you may call the Contest Coordinator at (206) 524-2744. Pacific Time Zone 9AM to 3PM. (Don't just call to say you are writing an adventure.)
18. This contest is void where prohibited by law.

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```
]LIST

10  REM

SO WHAT DID YOU EXPECT

VAL J GOLDING

CALL -A.P.P.L.E.

100 HEX$ = "0:A0 3 98
      N303:43 41 4C
      4C 20 2D 41 2E
      50 2E 50 2E 4C
      2E 45 2E 22 0
      ND9C6G": FOR I
      = 1 TO  LEN (HEX$):
      POKE 511 + I,
      ASC ( MID$ (HEX$,I,1))
       + 128: NEXT :
      POKE 72,0: CALL
       - 144
110  CALL  - APPLE
```

SO WHAT DID YOU EXPECT?

OUR SMALLEST CONTEST YET!

Help Wanted:

FIVE judges for our So What Did You Expect contest as announced in the August issue of *Call — A.P.P.L.E.* Judges will be selected by lot from all applications postmarked prior to Feb. 1, 1983, and must include the following information with their application to judge. A.P.P.L.E. employees are not eligible to participate.

1. Name
2. Address
3. Phone
4. A.P.P.L.E. membership number

Those judges who submit final scoring on So What will receive their choice of any A.P.P.L.E. software package. All communications shall be addressed to "So What Contest" *Call — A.P.P.L.E.* Editorial Department, 5606 California Ave SW, Seattle, WA 98136. Potential submitters of So What Did You Expect for 1983, when we **expect** to run a similar contest, would be well advised to read the following scoring criteria upon which the judges will base their points.

Scoring Criteria

Four categories have been established that points may be awarded on. Listed in order of ascending importance and with point ranges, they are:

1. Originality of idea (0—10)
2. "Cute" or humorous aspects (0—20)
3. Uniqueness of application. Has it been done before? Does it introduce new or altered programming concepts? (0–30)
4. When the program is run, does it cause the reader to delve into it, to find out what makes it tick, to make the reader think, and most importantly, to learn? (0—40)

Prizes will be awarded on the basis of averaging scores calculated by the five judges. In addition, any So What entry which does not otherwise qualify as a winner, based on the composite scoring, but which was scored first by any individual judge, will receive an appropriate supplemental prize.

Each judge will receive photocopies, appropriately numbered, of all So What submissions. Those numbers will be the sole reference used for point scoring. All So What's published in 1982 will be eligible for consideration, including "All About DOS," irrespective of publication date.

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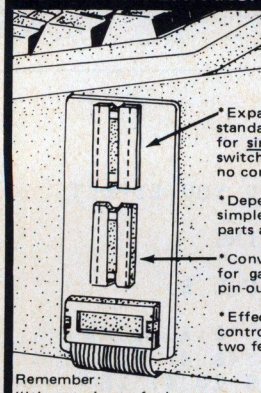

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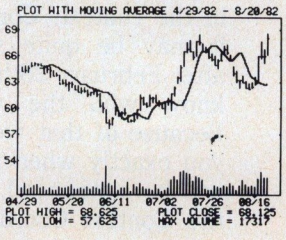

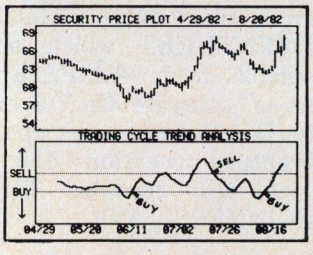

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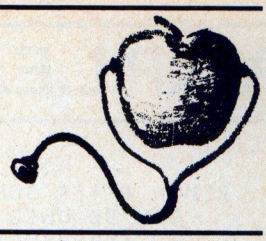


Cornelis Bongers/Call -A.P.P.L.E. Staff Writer

Question:

Would you or one of your staff writers please explain why the two rounding programs do not produced the same results.

```
]LIST

100  INPUT X
110 X =  INT ((X + .005)
      * 100) / 100
120  PRINT X

]RUN
?4.005
4
```

```
]LIST

100  INPUT X
105  LET Y = (X + .005)
      * 100
110 X =  INT (Y) / 100
120  PRINT X

]RUN
?4.005
4.01
```

Answer

The problem you describe is a common one and it is caused by the fact that not all FP numbers can be represented in a finite expansion. What this means is illustrated by the following example:

3 x 1/3 = 1

but

3 x .33333 <> 1

If you try to convert 1/3 to the decimal system, then no matter how many digits precision you take a multiplication with 3 never leads to the correct answer (i.e., 1).

Likewise, if you calculate the expression

(X+.005) x 100

the result is slightly less than 401 if X =4.005. As you may know, results of calculations are stored in the main floating point accumulator (MFP). The MFP uses for most calculations not 4 bytes for the mantisse, but 5. When the contents of the MFP have to be stored in a variable (i.e., Y=(X+.005) x 100), the mantisse of the MFP is rounded off to 4 bytes, being the number of bytes available (for the mantisse) in the storage area of real variables. The rounding is done according to the value of the 5th mantisse byte of the MFP.

The result of the expression (1) equals

89	C8 7F FF FF	D0
exp	mantisse	5th byte of m.*

(*approx 400.9999...)

so rounding off leads to

89 C8 80 00 00

which is the correct value of 401.

Hence, Y in line 105 of program number 2 becomes 401 and X assumes the value 4.01 after execution of line 110.

However, in program number 1, X is calculated by a one liner. Applesoft first calculates the part of the expression that corresponds to (1) above. Next the INT function is applied to the MFP, but since the MFP contains approximately the value 400.9999.., the result will be 400. As a consequence X assumes the value 4.

In summary, the cause of your problem is thus that the MFP is not rounded off (to a 4 byte mantisse) before the INT function is taken. This is a decision made by the designers of Applesoft and it is not unreasonable, for rounding off the MFP before taking (f.i.) the INT function may lead to the result:

INT ((4.005+.00499999999)×100)/100 = 4.01

which is equally undesirable.

As a general rule, you should keep in mind that when working with FP values, results need not be exact. By the way, if you are bothered by output problems in Applesoft, why not use & PRINT USNG "0.00";X (from "Print Using and Friends" *(Call -A.P.P.L.E. in Depth 1, All About Applesoft)* which is more convenient and reliable than doing the rounding off in BASIC.

For a different approach and additional explanation, the reader is directed to David Lingwood's article in this issue on problem solving.

Question

I have enjoyed immensely your articles in Call - A.P.P.L.E. *and have found them to be very informative. I have a question that I would appreciate your help on. The question is how can I PEEK/POKE the drive number in DOS? I have had no luck at figuring out the answer to this query.*

Question

I have been using your DOS MOVER from Call -A.P.P.L.E. *with great success. However, prior to DOS MOVER, I saved much time by turning on the disk drive motors during long reads and writes, then off again.*

I would appreciate it greatly if you could supply the correct addresses now that DOS is moved. I have tried unsuccessfully.

Answer

The listing shown on page 80 shows how to PEEK/POKE the drive number in DOS. For this purpose a small ML program is POKEed at $300 first. In case other routines reside at $300, you have to POKE the routine elsewhere (and adjust the CALL instructions appropriately), which causes no problems as the routine is relocatable. A special note, it is best to try this on a scratch disk first, since one typo could wipe out an entire disk.

Question

I want to know why some commercially available programs such as Apple's CONTROLLER and A.P.P.L.E.'s APMAIL choose to disconnect DOS when activating the printer. They take the trouble to PEEK the I/O hooks and save them, then use PR#0 followed by PR#1. Later they have to POKE the DOS vectors back in the hooks. What does DOS do to the printer and whatever happened to CALL 1002?

Answer

Both the CONTROLLER and APMAIL go back to the bugs of DOS 3.1. The reason for resetting the hooks (which temporarily disabled DOS) was to prevent keyboard entry from erroneously being misinterpreted as a DOS command. To illustrate, an INPUT statement which requested entry of a last name (in this example, the name is BRUNGAARD) would have been misinterpreted by DOS 3.1 as a command to BRUN a file named GAARD, and would have created an error condition when the file was not found, and would also write a file title of GAARD to the directory. In addition, 3.1 DOS did not have the $3EA vector (CALL 1002) to reconnect DOS.

A.P.P.L.E. DOCTOR

```
]LIST

1   REM    ***** SOME ROUTINES THAT
       CAN BE USED WITH DOS MOVER
       AND AMPERSOFT
2   REM   ***** CALL 768:PRINT PEEK
       (255) RETURNS CURRENT DRIVE
       #
3   REM   ***** POKE 255,2:CALL 768
       +15 SETS CURRENT DRIVE # TO
       2
4   REM   ***** CALL 768+30 LET MOT
       OR STAY ON AFTER DISK OPERAT
       ION
5   REM   ***** CALL 768+45 TURNS M
       OTOR OFF
7   GOSUB 1000 : REM  POKE ML PROG
       RAM AT $300
10  GOSUB 100: REM  PRINT CURRENT
       DRIVE NO
20  PRINT : INPUT "ENTER DRIVE #
       ";B: REM  NOW ASK FOR NEW DR
       IVE #
30  POKE 255,B: REM  STORE DRIVE
       # IN LOC $FF
40  CALL 768 + 15: REM  STORE DRI
       VE # IN DOS
50  GOSUB 100
60  CALL 768 + 30: REM   DISABLE
       DOS INSTRUCTION TO PUT MOTOR
       OFF
65  PRINT : PRINT "MOTOR WILL STA
       Y ON AFTER NEXT CATALOG"
66  FOR I = 1 TO 1000: NEXT
70  GOSUB 100
75  PRINT : PRINT "MOTOR STAYS ON
       FOR A WHILE"
80  FOR I = 1 TO 4000: NEXT : REM
       WAIT SOME TIME
90  GOSUB 100
95  CALL 768 + 45: REM  TURN MOTO
       R OFF (AND RESTORE DOS INSTR
       UCTION)
97  PRINT : PRINT "END OF DEMO"
99  END
100  REM  PRINT CURRENT DRIVE # A
       ND CATALOG
110  CALL 768:A =  PEEK (255): PRINT
       "DRIVE ";A;" IS ACTIVE"
120  PRINT  CHR$ (4);"CATALOG"
130  RETURN
990  REM  ***** WARNING *****
995  REM    BE SURE YOU COPY THE
       VALUES BELOW EXACTLY, FOR
996  REM  ONE ERROR MAY DESTROY A
       DISK IN A SECOND.
997  REM  PREFERABLY THE ROUTINE
       SHOULD BE TESTED
998  REM  WITH A SCRATCH DISKETTE
       FIRST.
1000  DATA  173,131,192,173,131,1
      92,173,104,234,133,255
1010  DATA  173,130,192,96,173,13
      1,192,173,131,192,165,255
1020  DATA  141,104,234,173,130,1
      92,96,173,131,192,173
1030  DATA  131,192,169,96,141,77
      ,254,173,130,192,96,173
1040  DATA  131,192,173,131,192,1
      69,189,141,77,254,141,232
1050  DATA  192,173,130,192,96
2000  FOR I = 768 TO 830: READ A:
       POKE I,A: NEXT : RETURN
```

```
]LIST

5  REM

SO WHAT DID YOU EXPECT?

BILL BOUMA : CALL -A.P.P.L.E


7  ONERR  GOTO 100
10  DIM ST(32,1):SP
       = 0:LN = 120:P4
       = .785398163:AN
       = SP:S2 =  SQR
       (2)
20  HGR2 : HCOLOR= 7:X
       = 79:Y = 60: HPLOT
       X,Y
30  IF LN > 2 THEN 50
40 X = X +  COS (AN
       * P4) * LN:Y =
       Y +  SIN (AN *
       P4) * LN: HPLOT
        TO X,Y:SP = SP
       - 1:LN = ST(SP,0):AN
       = ST(SP,1): GOTO
       30
50 LN = LN / S2:ST(SP,0)
       = LN:ST(SP,1)
       = AN - 1:AN =
       AN + 1:SP = SP
       + 1: GOTO 30
100  END
```


BEEP! LOST YOUR PROGRAM?

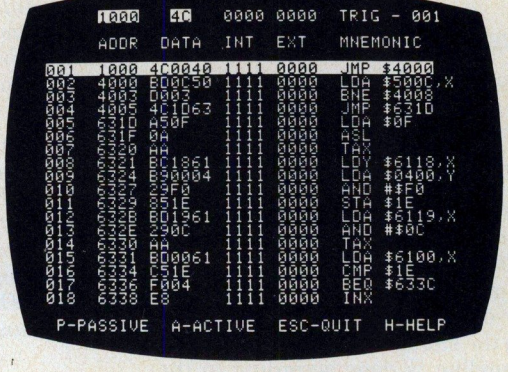
BUS RIDER
LOGIC ANALYZER FOR THE APPLE II

The Bus Rider is a self diagnostic development tool that allows real time analysis of software and hardware in the Apple II computer.

The Bus Rider provides:

- Monitors and saves 512 cycles of the address and data bus, NMI, IRQ, DMA, R/W and 4 external lines.
- Pretrigger viewing of up to 512 samples.
- 4 external inputs with variable threshold reference.
- Display cycle by cycle execution or 6502 disassembled code.

The Bus Rider comes complete with Bus Rider circuit card, reference manual, Bus Rider software diskette, and 10 easy hook external input cable. The total system price is **$395.00**



Bus Rider – Disassembled Display

RC Electronics Inc.
5386 Hollister Avenue, #D
Santa Barbara, CA 93111
(805) 968-6614 • TELEX 295281

MC Visa

The arcade-warp is open!

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Tubeway! It's an insidious invasion route created by beings from a parallel universe—a strange, geometric universe. You're trapped on the rim as their fleet swarms out of the warp on a voyage of conquest. The battle is yours alone—and it's far from easy because normal strategy doesn't work! . . . you have to fight by their strange, geometric rules!

Here's the fastest, most fascinating of the new style space games. So involving and exciting it's destined to become an all-star, all-time hit. Be one of the first to take on the challenge of the lightfast Tubeway!

$34.95 for the Apple II*. At your computer store or:

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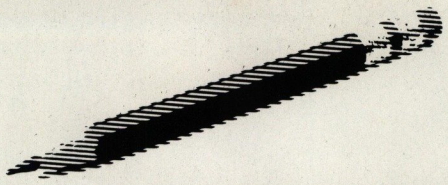
(213) 709-1202

VISA/MASTERCARD accepted. $2.00 shipping/handling charge. (California residents add 6½% sales tax.)

COREY WOLFE

*Apple II is a trademark of Apple Computer, Inc.

WRITE -A.P.P.L.E.



The Readers

Splitting Up

Dear Val,

I recently had need to use Charles Kluepfels excellent SPLITTER routine. He notes in the October 1980 issue (as well as the first In Depth volume) that after splitting a program that it can be re-entered only with a RUN command. Indeed, after activating the routine with the necessary POKEs to $6 (the length of the gap) and $7 (starting location of the gap), and CALLing 37888 from within a program, the program is aborted and the user placed squarely in Applesoft. This can be avoided by substistituting the following bytes in the SPLITTER routine itself:

949F: 12 D9

Calling the modified SPLITTER will allow the Applesoft program to continue uninterrupted.

Bruce McCoy
163 Union City Rd
Prospect, CT 06712

A TUTORIAL on using the Splitter is forthcoming shortly, along with a reprint of code for the benefit of those readers unfamiliar with it.

The Source

Dear Val,

I saw in the August *Call-A.P.P.L.E.* that your club is offering special prices for members for THE SOURCE....My club is negotiating a similar sort of arrangement with a local look-alike called "The Australian Beginnings." ...(also) we hope to use a bulletin board and the mailing system for club information.

Could you pass this letter along to your SOURCE experts with a request for any advice they may care to give us. We would be most grateful to hear of any pitfalls before we discover them the hard way....

Denis Kennedy, President
Victorian Apple Computers in Education
P.O. Box 108
Broadford, Vic. 3658
Australia

HOW ABOUT IT? If you've experience and tips in setting up a club communication system, SOURCE, or otherwise, drop Denis a line. Send us a copy, too; several folks are interested in the experiences of network builders.

New Technique

Dear Val,

Some of your newer users may not know they can easily draw horizontal and vertical lines on their screens using the INVERSE command instead of graphics mode.

Example using lines to divide text material:

LISTING 1

```
]LIST

5   IF  PEEK (978) =
      190 THEN 140
7   REM  LINES
10   HOME
15   REM  PRINT HORIZONTAL
       LINE
20   FOR C = 1 TO 20
30   INVERSE
40   VTAB 14: HTAB C:
       PRINT " "
50   NEXT C
55   REM  PRINT VERTICAL
       LINE
60   FOR R = 8 TO 20
70   HTAB 20: VTAB R:
       PRINT " "
80   NEXT R
90   NORMAL
```

Example drawing a horizontal line from a variable:

LISTING 2

```
]LIST

5   IF  PEEK (978) =
      190 THEN 140
7   REM  VARIABLE LINE
10   REM  SCALE OF 1
       COLUMN =5%
15   REM  PRINT HORIZONTAL
       LINE
20   FOR C = 1 TO 20
30   HOME
40   VTAB 9: HTAB 1:
       PRINT "NAME X"
50 P = 65: REM  SUPPOSE
       65% HAS BEEN CALCULATE
       D FOR NAME X USING
       VARIABLE"P"
55   REM  PRINT VERTICAL
       LINE
60 CP = 10 + P / 5:
       REM  START IN
       COL 10+(%/SCALE
       OF 5% PER COL)
70   FOR C = 10 TO CP
80   INVERSE
90   VTAB 9: HTAB C:
       PRINT " "
100   NEXT C
110   NORMAL
120   VTAB 9: HTAB (CP):
       PRINT P"%"
```

To add another % line, change the VTAB number, name, and value of variable.

B. J. Wilson
P.O. Box 12628
Seattle, WA 98111

PS: Thank you for an informative magazine, I have been told it is not posible to make horizontal lines in text material on an Apple.

```
]LIST

5   REM

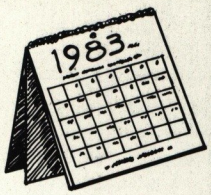
SO WHAT DID YOU EXPECT
      DEPT

ALAN BAXTER-CALL -A.P.P.L.E.


10   DATA  67,65,76,76,45,65,
       46,80,46,80,46,76,46,6
       9,46,33,32
20   TEXT : HOME :XO
       = 18:YO = 15:A
       = 3.5:DANG = 0.58905:A
       NG = 9.42478:I
       = 1
30   READ TITL:X1 =
       COS (ANG) * A
       *  SQR (ANG) +
       0.5:Y1 =  SIN
       (ANG) * A *  SQR
       (ANG) + 0.5
40 X = XO +  INT (X1):Y
       = YO -  INT (Y1):
       VTAB Y: HTAB X:
       PRINT  CHR$ (TITL)
50 K =  PEEK ( - 16384):
       IF K > 197 THEN
       90
60 ANG = ANG - DANG:
       IF ANG < 0.5 THEN
       ANG = 9.42478:
       POKE 1849,106
70 I = I + 1: IF I >
       17 THEN I = 1:
       RESTORE
80   FOR J = 1 TO 200:
       NEXT : GOTO 30
90   POKE  - 16368,0:
       NORMAL : END
100   REM

IF YOU GET BORED, CHANGE
A TO 1.6 IN LINE 20
AND SQR(ANG) TO
ANG IN LINE 30
```

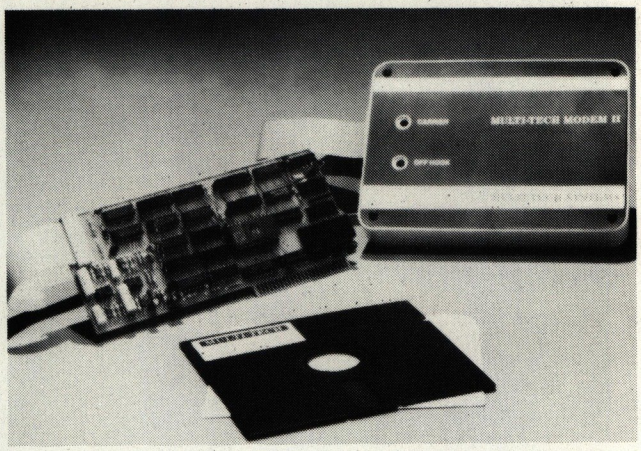
TOMORROW'S APPLES TODAY



Kevin O. Donohoe/Editor

NEW USER-FRIENDLY MODEM AVAILABLE FOR APPLE II AND APPLE II PLUS

Designed by Multi-Tech Systems, Inc. for use with an Apple II, Apple II Plus or Bell and Howell computer, the user-friendly Modem II features complete menu driven software with user prompts at all levels of command entry and keyboard dialing for ease of operation.



The Modem II does not require the use of a serial interface card. It plugs directly into one of the I/O slots inside the computer for full or half duplex communications at either 110 or 300 bits per second. Software compatible with other Apple II smart modems, this unit provides crystal-controlled, digital transmission and reception of data to other Bell 103-type equipment with a high degree of accuracy.

It is equipped with firmware for direct communications from a "bare bones" computer and comes with a software disk containing various utility programs including the terminal program. This FCC registered unit is also equipped with a built-in speaker to allow audible monitoring of call progress as well as auto-dail and auto-answer. The suggested retail price for the unit is $369.00.

Multi-Tech Systems, Inc., 82 - Second Avenue SE, New Brighton, MN 55115, (612) 631-3550.

MAYDAY™

The **MAYDAY 60** is designed especially for those small microcomputers that must have a true 60 cycle sine wave power to operate AC motors, fans, etc.

MAYDAY 60 is a switchable Uninterruptible Power Supply developed by Sun Research, Inc. to provide complete brownout and blackout protection for mini/microcomputers and microprocessors or electronic equipment.

Our **MAYDAY 60** systems are designed to give the operator a minimum of 30 minutes of user time at the rated wattage of the system with a fully charged battery. **MAYDAY 60** maintains the program in the computer and also allows the operator to save the program of data on a disk by performing a soft shut down.

MAYDAY 60 provides a two-stage regulated battery charger to insure that the battery is always ready to be used. Available accessories include our Constant Voltage Regulator when using normal A.C. power (see our MDS Series), a smart circuit that provides battery condition indicator lights, low batter alarm and computer I/O port for status reporting.

The **MAYDAY 60** series comes in three wattages: 150, 250, and 600 watts. The "S" designation indicates that this model is equipped with the Line Surge Protector (see MDS series). Also see specifications on the reverse of this sheet.

All **MAYDAY 60** series UPS systems come complete with battery pack, which includes a 12-volt Deep Cycle Battery in a plastic marine battery case. Typical recharge time is 4 to 6 hours for 90% charge replacement. Optional battery packs available are a non-liquid lead acid battery or a sealed cell pack. These may be obtained locally or from Sun Research, Inc.

MAYDAY 60 comes complete and ready to be plugged in. No rewiring of your unit is necessary. Some mini/microcomputers include all Radio Shack Model II and 16, Commadore, Ohio Scientific, IBM, Apple, etc., including hard disk drives.

01

MAYDAY	150watts	$ 400.00
MAYDAY60+S	150watts	475.00
MAYDAY60+2	250watts	525.00
MAYDAY60+2S	250watts	700.00
MAYDAY60+6	600watts	900.00
MAYDAY60+6S	600watts	1140.00
MAYDAY60+10*	1000watts	1950.00

*Switch-over time 50 ms

"S" designator denotes surge protection built in.

BASIC EXTENSION

Don't waste time waiting for the computer! Get the job done fast! By using Basic Extension the efficiency of your programs can be substantially improved, and the development time reduced. No knowledge of machine language is required. All you need to know is basic!

Basic Extension is a group of machine language routines (invokable moduals) that can be added into your Business Basic program. There are three types of routines: disk, array, and utility. The disk routines can speed up disk access by a factor of ten, save 20%-30% on disk space, and allow access to files of any type. Array routines dramatically spped up the manipulation of string and numeric arrays (great for basic sorts and insertions). The utility routines add features that are not normally utiltiy routines add features that are not normally available in Business Basic: reset disable, string upshift, typehead buffer set/clear, and more!

Speed up your programs, save disk space, add new functions, decrease development time, ideal for software developers and independent programmers.

Basic Extension is a handsomely bound two-disk set containing invokable moduals, extensive documentation and demonstration programs.

Note: Also included as a demonstration program, is a 'font' file editor. It will allow you to easily edit the character sets stored in font files. Requires Apple /// Business Basic. Suggested retail: $95.

How to get your fir

You're not alone, you know.

We've all been through that same excruciating moment when we realized that we were going to have to learn a lot more than we wanted to know about programming, in self-defense.

But most of us survived.

Many of us with a little bit of help called dBASE II, the relational database management system (DBMS) for micros.

The best defense is a strong offense.

Don't get seduced by BASIC, because basically BASIC is weak. And to make it do anything useful can take 10 times as much programming (and time) as with dBASE II.

dBASE II is much easier because it's a relational DBMS, and you control your information with powerful, English-like commands.

With a word or two, you CREATE databases, APPEND new data, UPDATE, MODIFY and REPLACE fields, records and entire databases. DISPLAY some or all of your data for any conditions you want to apply. Organize months worth of data in minutes with REPORT.

You can prepare your forms and formats precisely the way you want them. Do calculations on fields, records and entire databases with 10-place accuracy.

And do even more with dozens of other commands.

Here's the catch.

With any language, you'll need to understand relational operators ("less than," "greater than," "equals") and a bit of logic ("or," "and," "not").

With dBASE II, you'll also get an easy way to make choices (IF..THEN..ELSE) and a powerful way to perform repetitive tasks (DO WHILE..).

With these tools, you're ready to tackle your accounting and time billing, project management, and any other data handling and record keeping. You can work interactively and get your answers right now. Or save your instructions and repeat everything with two words: DO Manhours, DO ProjectX, DO whatever has to be done.

Use dBASE II to help make your choice.

If you've got a 48k CP/M micro with a disk drive (96k IBM PC), send us $700 ($400 for a 56k Apple). We'll send you a copy of dBASE II to use free for 30 days.

the best of st micro.

Instead of just poring over a manual, run it and make certain that dBASE II does what you need done.

Then if you find it isn't right for you, send it back and we'll return your money, no questions asked.

But we know that you'll probably keep it.

Because having dBASE II is like having a black belt in micros.

Call (213) 204-5570 today or drop by your local computer store for the rest of the story.

Ashton-Tate, 9929 Jefferson Blvd., Culver City, CA 90230.

Ashton-Tate

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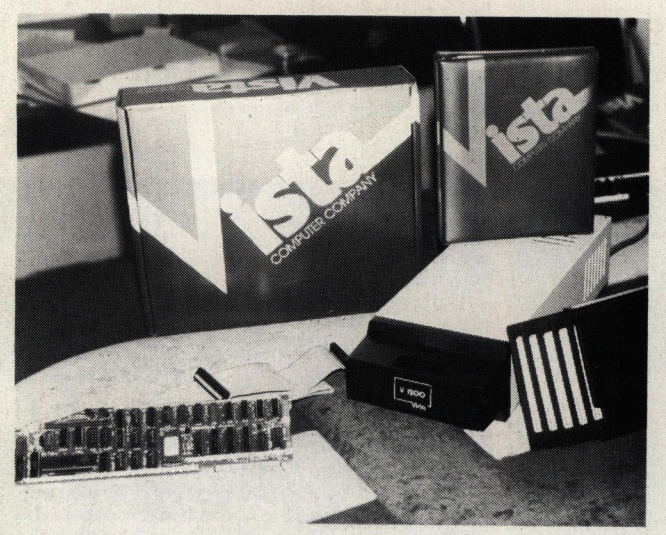
TOMORROW'S APPLES TODAY

V1200

Vista Computer Company Inc. introduces a new alternative to hard disk storage. The Vista V1200 offers the user, 6 Megabytes of removable, replaceable, interchangable storage in a plastic cartridge.



The V1200 uses the latest innovations in floppy storage technology to achieve 6Mb of storage in a pack of five 5¼" diskettes. The cartridge is slightly smaller than a standard box of ten minifloppy diskettes.

At $1549.00 (Sugg. Mfgr. list), the V1200 offers the user the speed and storage benefits of a hard disk, while retaining the removability and backup benefits of floppy.

For more information, please contact Vista Computer, 1317 Edinger, Santa Ana, CA 92705 (714) 953-0523, or an authorized Vista Dealer/Distributor.

AMPERWARE

Amperware is a software package which significantly extends the capabilities of Applesoft™ BASIC. Once **Amperware** is loaded, any of its many commands may be used in Applesoft™ programs. **Amperware** commands are much like Applesoft™ commands but are much more powerful. **&INPUT,** for example, allows upper/lower case character entry without additional hardware; accepts commas, colons, and quotation marks; limits the length of responses; controls the type (string, real, or integer) of response; supports default responses easily; intercepts illegal characters; provides full in-line editing (insert/delete characters, clear to end, restore default); allows special characters ([,], , , , ,|, , and _) to be entered and allows control codes to be processed easily. Another example of **Amperware's** powerful command set are its disk commands, **&READ** and **&WRITE.** With these commands you can: recall or store information up to *20 times faster* than with the standard DOS commands; handle commas in disk files; read or write entire arrays in a single statement; and save up to 75% on disk storage space. **&PRINT WITH** is **Amperware**'s answer to PRINT USING, allowing either text or numeric information to be easily formatted. Of course, **Amperware** allows GOTO and GOSUB to a variable, deleting of individual arrays, and fast sorting and searching of string or numeric arrays. **Amperware** also provides you with powerful commands to control the Apple 40 column or 80-column displays, allowing one program to work with either format.

An extensive tutorial and reference manual comes with **Amperware** to allow it to be used to its fullest potential. **Amperware** is provided on disk in standard DOS 2.2 format, and it is not copy protected. It may be used in any commercial program if a credit is given.

Amperware is available from dealers or directly from Scientific Software Products, 3171 Donald Avenue, Indianapolis, IN 46224 for $49.95 (add $1.50 shipping and handling).

PIEMAN

The penguins at Penguin Software were recently spotted (well, they weren't really spotted) migrating towards the vast Game Tundra — a place no penguin has ever been seen before. The strangest thing about these penguins, though, is that they were all wearing baker's hats! And as they waddled along they seemed to be changing something that sounded like MANPIEMANPIEMANPIE no wait, it was PIE MAN PIE MAN PIE MAN.

When we asked to explain this puzzling chant, the head penguin began to relate the tale of PIE MAN.

"You see," said the penguin, "PIE MAN works in a bakery. After the pies come out of the oven and onto a conveyor belt, it's PIE MAN's job to put whipped cream and a cherry on each pie then put it in the pie bin. PIE MAN dreams of becoming chief baker as he rushes around dodging flour sacks, grease spots and the slightly tipsy wedding cake baker. The pies come out of the oven faster and faster until. . .well, what ends up on the floor is not a pretty sight."

Then the penguin said, "We must continue our journey into the Game Tundra. PIE MAN is the first. There will be more to follow."

PIE MAN was written by Eagle Berns and Michael Kosaka for the Apple II+. It works with keyboard or joystick (including Atari joysitck) and retails for $29.95.

A STATISTICAL ANALYSIS SYSTEM FOR APPLE COMPUTERS

SoftCorp International, Inc. is introducing speedSTAT™, a major statistical analysis system for Apple II computers. Premiere showing will be at the "Applefest" computer show in San Francisco November 18-22. SpeedSTAT Volume 1: Frequencies & Crosstabs, has a capacity of over 10,000 data points and over 30 different statistical measures.

SpeedSTAT is very fast and very easy to learn, according to SoftCorp International Vice President Thomas E. Simpson. The content of the illustated user's manual, and the overall design of the software assume that the user has little or no computer experience. SpeedSTAT is designed for small business and professional users, including marketing professionals. It enables them to easily perform statistical analyses of demographics studies, product testing and market research data.

SpeedSTAT requires an Apple II or Apple II Plus with 48k and two disk drives. SpeedSTAT Volume 1 will retail at $250 and will be available in mid-November through Apple dealers nationally. SoftCorp International, Inc. has offices at 229 Huber Village Boulevard, Westerville, Ohio 43081 (phone 614/890-2820). For product information and orders, phone 800/543-1350.

CP/M UTILITY PROGRAMS

CP/M Disk Operating Programs are simple to use and need a minimum of learning to operate. It is the most adaptable system for many different computers you can buy on the market today. However, to work with CP/M programs some utility features could save time and effort. Programs include: Disk Zap, to examine and repair diskette information; Test Editor, to write and correct programs or letters and save on diskette as well; File Map, to show where program files are on the diskette; List, to show programs or file in ASCII form on video screen; Single Drive Transfer, copy file or programs with first drive only; Directory with Stat, show all files and programs their length and available space on diskette; Copy, copy diskette from one drive to another; Purge, to review one by one file on one diskette and erase those not needed; Tang DOC, documentation on all the programs.

The programs are now offered on one diskette for CP/M users. These programs are initialized with single key stroke for convenience. They will work in single, double and extended double density formats. To change computer program under CP/M, Tangdata also offers a diskette including unload command to change X.com to X.Hex then use Disasm.com to create source code ready for changes you want to make.

All utility programs are aggressively priced for mass distribution. Programs are available from stock: 8″ — $24.95 and 5.25″ — $19.95. Single Density Diskettes are suitable for IBMPC, TRS80's, APPLE, WANT, EAGLE, OSBORNE, HEALTH/ZENTH, etc. using CPM operating systems. For more information, call Tangdata Corporation, 100 Eames Street, Framingham, MA (617) 872-7520.

KALEIDO-SOUND

Passport Designs, Inc., announces their entry into the entertainment software business today with KALEIDO—SOUND™, a real time graphics program that synchronizes to any audio input.

The audio signal from a home stereo, cassette player or a sound system can be plugged into the Apple II cassette port to drive four different kaleidoscope patterns, each with a selectable color scheme. The full color kaleidoscopes change color, pattern, and location dynamically on a CRT monitor, television, or video screen as the music changes frequency and loudness.

KALEIDO—SOUND is targeted toward a variety of audiences, music listeners, computer hobbiests, game enthusiasts, night clubs, and concert acts.

KALEIDO—SOUND has a suggested retail price of $39.95 (including connecting cable) and is available at computer stores nationwide or direct from Passport Designs, Inc.

For more information please contact: Chris Albano, V.P. Marketing, Passport Designs, Inc., 116 No. Cabrillo Hwy, Half Moon Bay, CA 94019, (419) 726-0280.

KALEIDO—SOUND is a trademark of Passport Designs, Inc. Apple II is a trademark of Apple Computer, Inc.

SOSCLOCK /// CALIBRATION UTILITY

System Fabricators has released a new utility diskette for use with the SOSCLOCK /// onboard clock for Apple ///. The clock timebase provided on the Apple /// motherboard often requires calibration in order to obtain maximum accuracy from the SOSCLOCK ///, in the past this procedure required either expensive frequency counters or long trial-and-error methods.

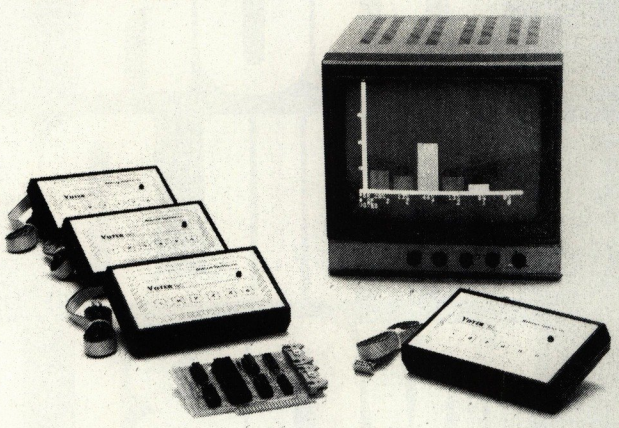
The calibration programs provided on the Utility diskette allow easy calibration of the clock speed using only a small screwdriver. Calibration to within a few seconds per month can typically be performed in less than ten minutes. Also included on the diskette are standard utilities for setting the clock from Apple /// Business Basic and Apple /// Pascal.

SOSCLOCK /// Calibration Utility V 2.2 is available as System Fabricators' part number 821021. Price is $20.00 per copy from Sysfab dealers or direct from: System Fabricators, 736 Hermosa Avenue, Hermosa Beach, CA 90254, 213-372-6273.

VOTER

VOTER 30 a new peripheral card links up to 30 participants to a single Apple II* computer.

VOTER 30 turns your Apple II* into a group response system, allowing up to thirty participants to respond to multiple choice questions—then letting them see the results immediately.



COMPLETE RECORDKEEPING — Each polling station, like each participant, is unique. VOTER 30 reports on group response and also keeps track of response by individual. This make VOTER 30 ideal for testing and market research applications.

SOFTWARE SUPPORT — VOTER 30 comes with BASIC language programs designed to help non-programming instructors write quizzes, retrieve and analyze test results. Diagnostic software will confirm whether the system is installed correctly.

FLEXIBILITY — VOTER 30 works in conjunction with other educational software, random access video systems, multiple video displays, etc. Polling stations are ordered in any quantity.

AFFORDABLE — The VOTER 30 interface card with all programs and manual costs $595. VOTER 30 polling stations cost $125 each and include cable and connectors.

Contact Reactive Systems, Inc., 40 North Van Brunt St., Englewood, NJ 07631, (201) 568-0481.

BYTE BOX

Designed specifically for your Apple II® and Apple II+®, the new Byte Box® offers you a variety of attractive features:

Program Protection — The Byte Box's® unique locking keyboard cover provides complete program protection. Only you have access to the keyboard, and if you have to leave your computer briefly while working, you can the lock the cover and leave your Apple II® and Apple II+® on.

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—◉→

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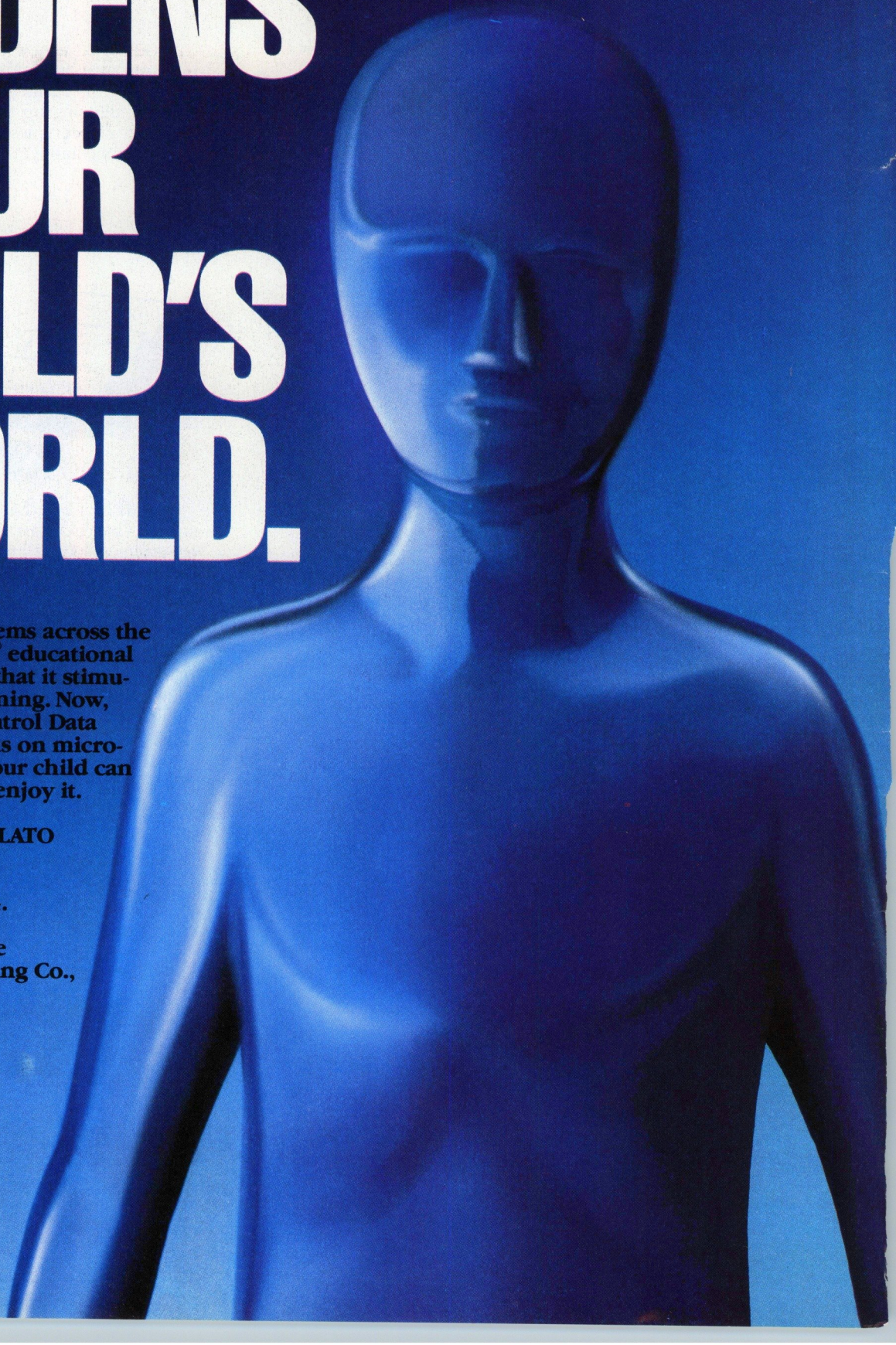

In public school systems across the United States, PLATO® educational software has proved that it stimulates and speeds learning. Now, for the first time, Control Data has put PLATO lessons on microcomputer disks, so your child can learn at home—and enjoy it.

For information on PLATO educational software, or to order, call toll free 800/233-3784. In California, call 800/233-3785, or write Control Data Publishing Co., P.O. Box 261127, San Diego, CA 92126.

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- PLATO® software now available on disks in Math, Physics, Foreign Languages, Computer Literacy—and more is on the way.
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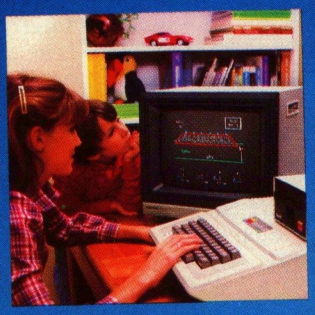
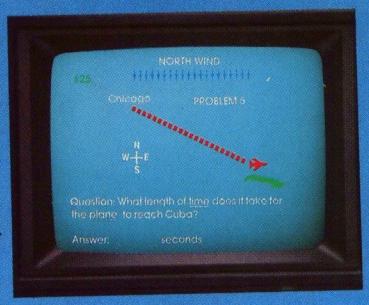
- Introductory Offering: Single lesson, $45.00; additional lessons, $35.00 each. 10-day money-back trial.

CHOOSE THE LESSONS THAT FIT YOUR CHILD'S NEEDS.



- **Basic Number Facts:** lets your child practice basic numbers, including addition without carrying, subtraction without borrowing and multiplication/division with single digits. Kids race against time to build up their speed in these math areas. Designed for elementary school age, or any child who needs practice with basic whole number operations.
- **Whole Numbers:** simulates a pinball game to hold and build interest in whole number operations. Problems include addition, subtraction, multiplication, division and mixed numbers. Designed for elementary and junior high age groups.
- **Decimals:** kids are challenged to break balloons by entering the correct decimal corresponding to the position of the balloon on a vertical line. Numbers are entered on a trial-and-error basis. Software automatically adjusts difficulty to the child's performance. For elementary math students.
- **Fractions:** same format as Decimals, but requires the use of fractions to break the balloons. Numbers are entered on a trial-and-error basis. Balloons may burst in any order until none are left. Difficulty adjusts to your child's performance. For elementary math students.
- **Computer Literacy—Introduction:** this lesson is presented in a friendly, non-intimidating manner with touches of humor and simple, supportive graphics. It presents the history and uses of computers in today's society. Designed for junior or senior high and vocational school students.
- **French Vocabulary Builder.**
- **Spanish Vocabulary Builder.**
- **German Vocabulary Builder:** students are presented with a basic vocabulary of 500 words, including useful verbs, number words or common words for traveling or in the home. Groups of related words give learners context and similarity clues, which help increase foreign language skills. Lessons supplement introductory and/or refresher coursework.
- **Physics—Elementary Mechanics:** provides a problem-solving test in the elementary mechanics of physics. Students are shown a physical problem; then must "purchase" the missing information needed to answer it correctly. The emphasis is on *understanding* the problem, rather than just supplying the correct answers. Designed for senior high age level.



CONTROL DATA

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Good Looks — The new Byte Box® is available in a wide variety of beautiful, hand-rubbed natural woods and a complete range of colorful simulated-leather laminates. And the sliding cover lets you transform your Apple II® and Apple II+® into a beautiful-crafted room furnishing in just seconds.

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SUPER SMART

SUPER SMART — smart terminal software for the APPLE II. SUPER SMART is a sophisticated terminal emulation package that utilizes the full capabilities of the D.C. Hayes Micromodem II for terminal to terminal and terminal to time-share computer communications. SUPER SMART can capture, create, edit, print, and save to disk up to 21,224 bytes of data. SUPER SMART can send or receive telegrams, HiRes pictures, BASIC or machine language programs, as well as canned messages and editor files.

SUPER SMART supports a full ASCII (upper and lower case) HiRes character set that can be customized, and a software shift-lock for ASCII or standard APPLE keyboard emulation.

A unique feature of SUPER SMART is its ability to access and maintain any number of phone list files each containing more than 500 entries. Any combination of up to 10 characters can be specified as a search key for which SUPER SMART will look-up and present all phone list entries containing the search key and will automatically dial selected entries. Manual phone number specifications with redial capability is provided for numbers not contained in the phone list. An instant access default phone number can be programmed-in to save time and keystrokes.

Requires: HAYES Micromodem II, 48K APPLE II/III+, 1 DISK II. Price: $60 from Softspoken, P.O. Box 7000-863, Redondo Beach, CA 90277.

SBCS AGRI-LEGER

SBCS Agri-Ledger is a double entry accounting system for agricultural operations, designed for the Apple II and III. This menu-driven program provides for income statements and balance sheets, budget reports, comparison of performance against projections, enterprise analysis and report combinations for up to 26 different operations with up to 99 different enterprises on each, quantity fields, Schedule F information, yearly history, and much more. Cash flow templates are included for both farm and personal items. The documentation, contained in an attractive self-standing binder, is detailed and easy to understand. Program backup disk is included. Demo package is available and comes with full documentation; price of the Demo can be credited towards purchase of full program. SBCS provides a lifetime warranty, free program updates and replacement of damaged disks, and friendly customer service. Additional ag modules which integrate with Agri-Ledger will be released at a later date. Agri-Ledger —$395. Demo — $30. Small Business Computer Systems, 4140 Greenwood, Lincoln, NE 68504 (402) 467-1878.

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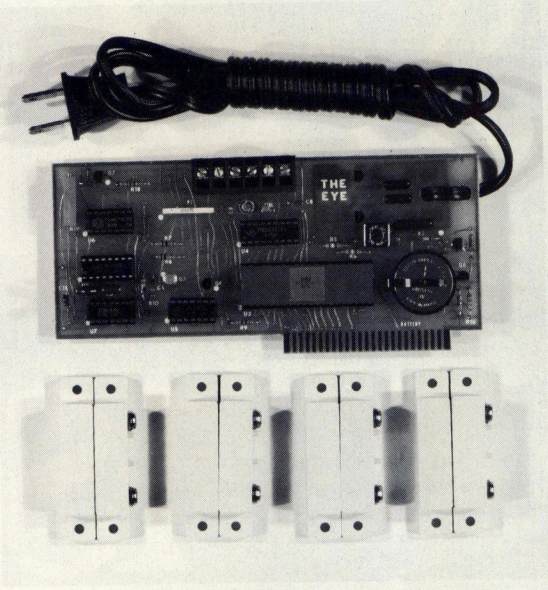

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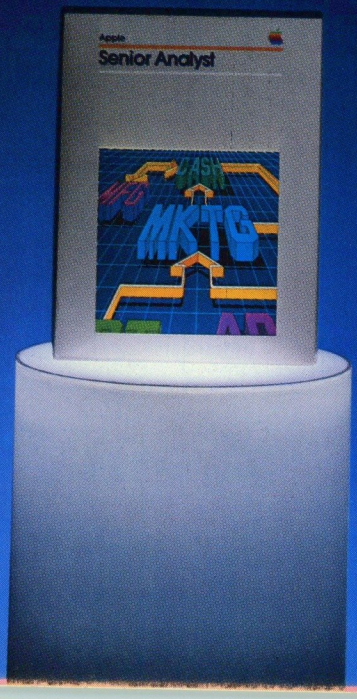


Just when the business world is up to its white collars in visiclones, calcalikes and other spreadsheet packages, Apple's® come out with something entirely different.

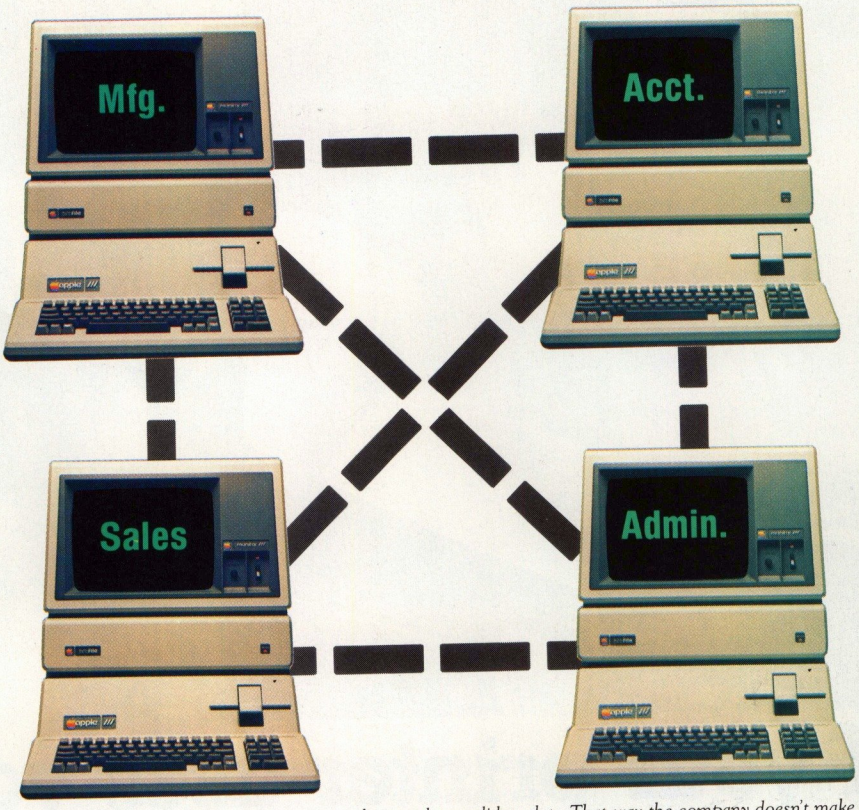
Introducing Senior Analyst.

Like other financial modeling packages, it allows managers and professionals to ask all those proverbial "What If?" questions.

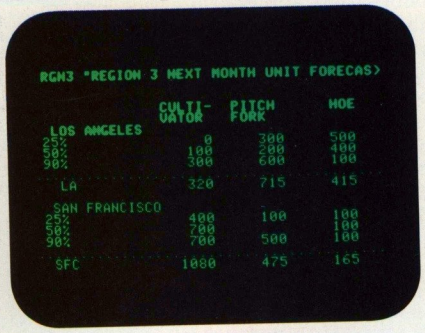
Unlike the others, this powerful financial planning tool was designed to be used in a corporate environment, by lots of people. So you get lots of advantages.

For example, you can transfer data (across diskettes) from one financial model to another. Or consolidate many models into one.

So sales, manufacturing, administration and any number of other departments (even in other cities) can easily share information. Giving each the power to create comprehensive and



Senior Analyst lets different departments share and consolidate data. That way the company doesn't make more pitchforks than it can sell.

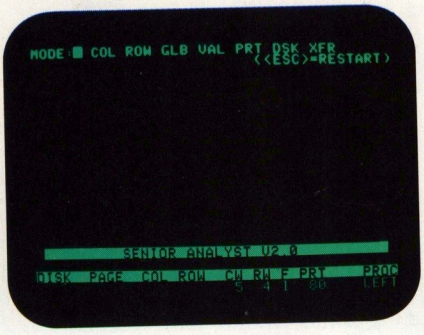


With Senior Analyst, you can now cultivate forecasts by merging reports from distant divisions.

flexible financial projections, budgets, cash flow statements and the like.

Want to combine selected data (such as important subtotals) from six different divisions? With Senior Analyst, you can do it. And even print out a formatted report that includes only the information you need.

A report that anyone can understand. Because the headings are in English, not in code.



Easy to follow commands allow employees to create models without learning a second language.

You can also document and print out all those assumptions used to create your model, to give others a concrete understanding of how you reached your conclusion. (The program even allows you to continue working while a model is being printed.)

To complement all these accommodating features, you'll also find built-in functions for depreciation, linear regression forecasting, and other powerful virtues not found in most financial software packages.

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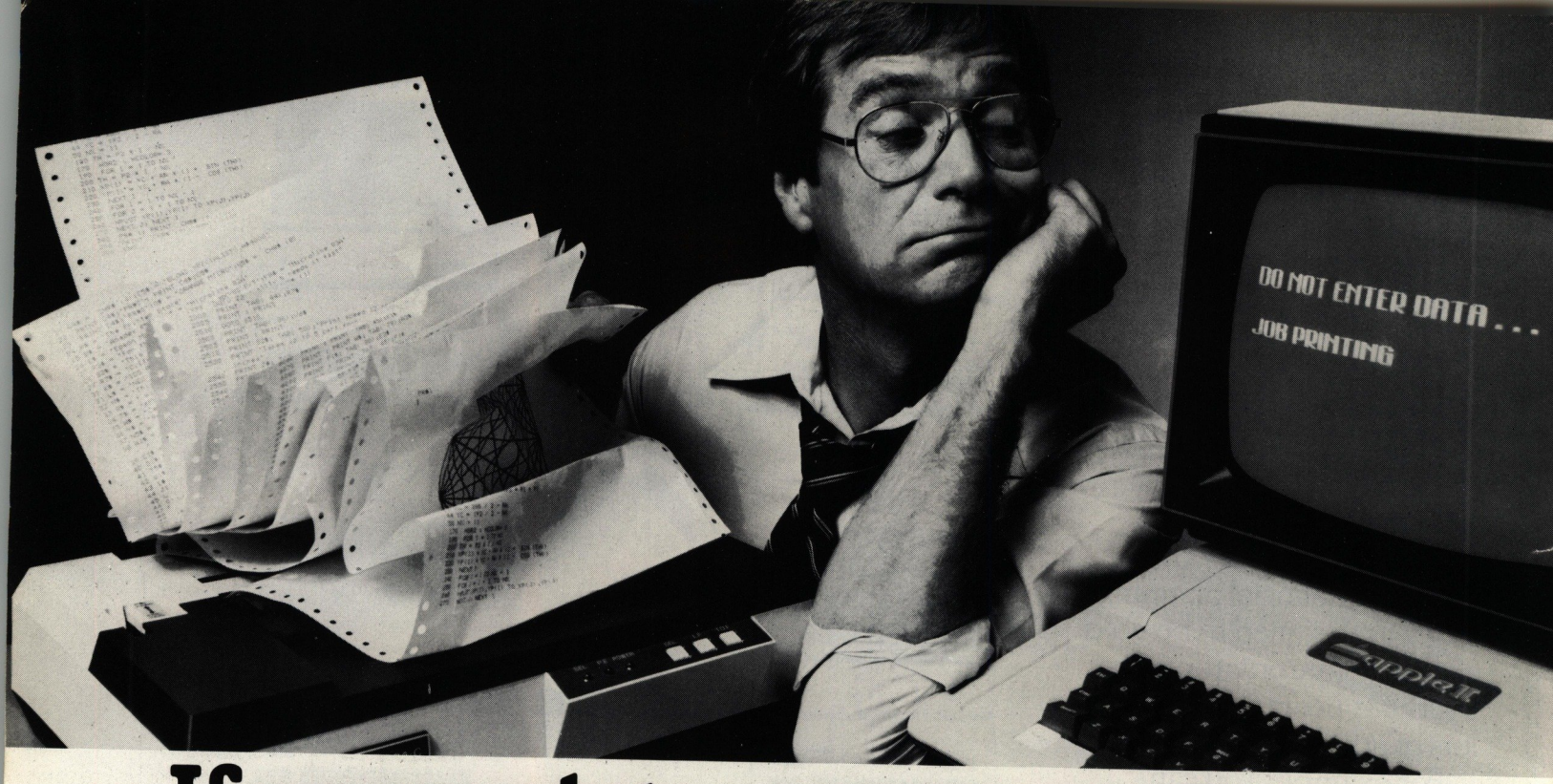
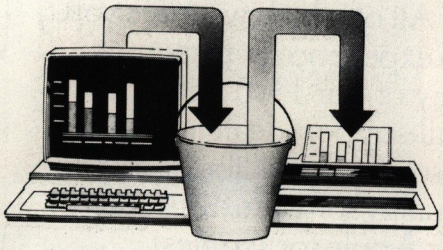


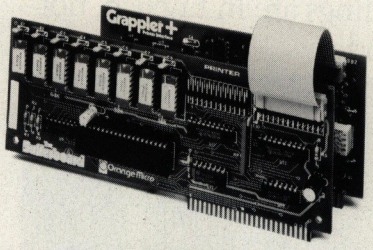
If your printer uses your Apple® more than you do, you need The Bufferboard.™

If your Apple is locked into the "PRINT" mode so much that you've taken up solitaire to kill the boredom, you need a buffer. And if your computer is the Apple II or III, the only buffer for you is The Bufferboard. Expandable to 64K of storage, The Bufferboard stores an instantaneous **bucketful** of print data from your computer. Then it feeds the data to your printer at its own printing rate. Your Apple is set free from driving your printer and is ready for more data from you.



Take your existing interface—and buffer it!

Only The Bufferboard has a simple Interface-Docking System. No bulky boxes or expensive power supplies are needed because The Bufferboard fits right into your Apple—and **docks** onto your existing printer interface. The result is convenient



and economical buffering of most popular printer interfaces, including the Grappler + ™ interface, Epson interface, and Apple printer interface. Thirty seconds and a single hook-up are all you need to end the printer waiting game forever.

Up to 20 letter-size pages stored at a time.

The Bufferboard comes standard with 16K, and is expandable to 32K or 64K of buffering capacity with the addition of memory chips. This "bucket" will hold up to 20 pages of a print job, allowing you freedom to use your Apple.

The Bufferboard—designed exclusively for the Apple Computer.

Specifications:

• Versions for Grappler + interface, Epson interface, Apple interface, and other popular printer interfaces • 16K buffer standard • Upgradeable to 32K or 64K • Automatic memory configuration • Automatic self test • Includes interface docking cable.

The Bufferboard is made by Orange Micro, Inc.; the same people who brought you the popular Grappler + printer interface. Both the Grappler + and The Bufferboard are now available at your local Apple dealer.

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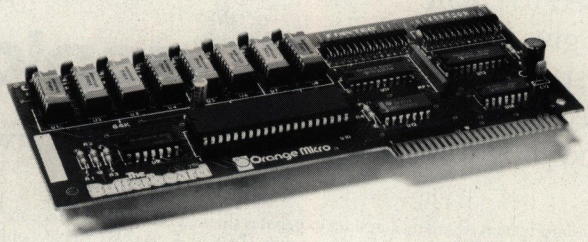
(714) 630-3620, TELEX: TX 183511 CSMA



The Bufferboard™
For Apples and Printers

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A.P.P.L.E. ORDER FORM

DATE _____

MEMBERSHIP NUMBER _____ EXPIRATION DATE _____

NAME _____ ADDRESS _____

CITY _____ STATE _____ ZIP _____ PHONE _____

PRODUCT	UNIT PRICE	*FOREIGN SHIPPING CHARGES (See below)	AMOUNT

VISA* Account No. _____ Subtotal _____

Exp. Date _____ **Washington sales tax _____

MasterCard Account No. _____ TOTAL AMOUNT _____

Exp. Date _____

FOREIGN SHIPPING/HANDLING CHARGES CHART

In an attempt to simplify things for our members outside the United States, we have devised this easy rate chart for figuring the shipping and handling charges on your order. Simply determine the **TOTAL** amount of your order and add the correct amount as corresponds to the rate chart. (NOTE: THIS DOES NOT APPLY TO APPLICATIONS OR RENEWALS — BUT TO PRODUCT ORDERS ONLY!)

total amount of order	shipping/handling
$ 0.00 - $ 20.00	add $ 6.00 to order
$ 20.01 - $ 60.00	add $12.00 to order
$ 60.01 - $100.00	add $18.00 to order
$100.01 - $140.00	add $24.00 to order
$140.01 - $175.00	add $30.00 to order
$175.01 - and over	add $36.00 to order

Note to Foreign Members: All hardware products, except AP.LCASE lower case adapters, must include a United States address. These products cannot be shipped outside U.S.

* Foreign Members Only

** Washington state residents add 6.5% state sales tax.

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304 Main Ave. S.
Renton, WA 98055

***NOTE: Canadian shipping/handling chart is being revised.**

REQUEST FOR CHANGE OF ADDRESS

Dear A.P.P.L.E.,

I am moving and my present address is:

PRESENT:

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EFFECTIVE DATE _____

NEW ADDRESS:

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ADDRESS _____

CITY _____

STATE _____ ZIP CODE _____

MEMBERSHIP NUMBER _____

*Please fill out and return this notice two weeks before you move.

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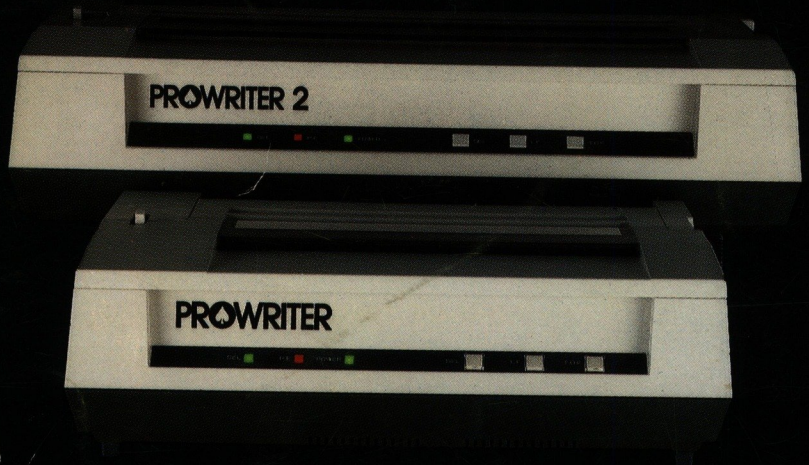

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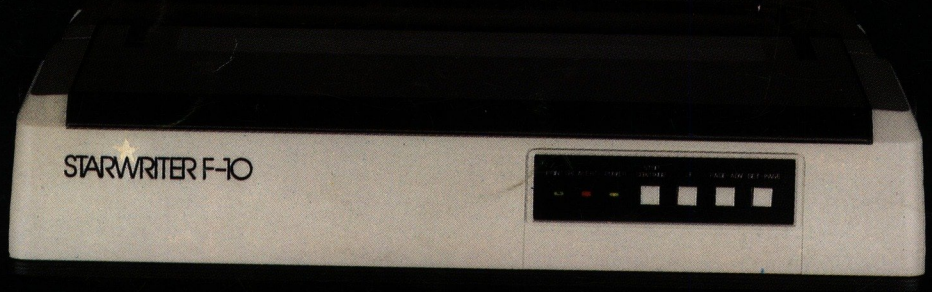

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